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STATISTICAL REPORTING SERVICE OF THE U.S. DEPARTMENT OF AGRICULTURE

- Scope
- Methods





Statistical Reporting Service
of the U.S. Department of Agriculture
Scope ● Methods

Prepared by
the Statistical Reporting Service

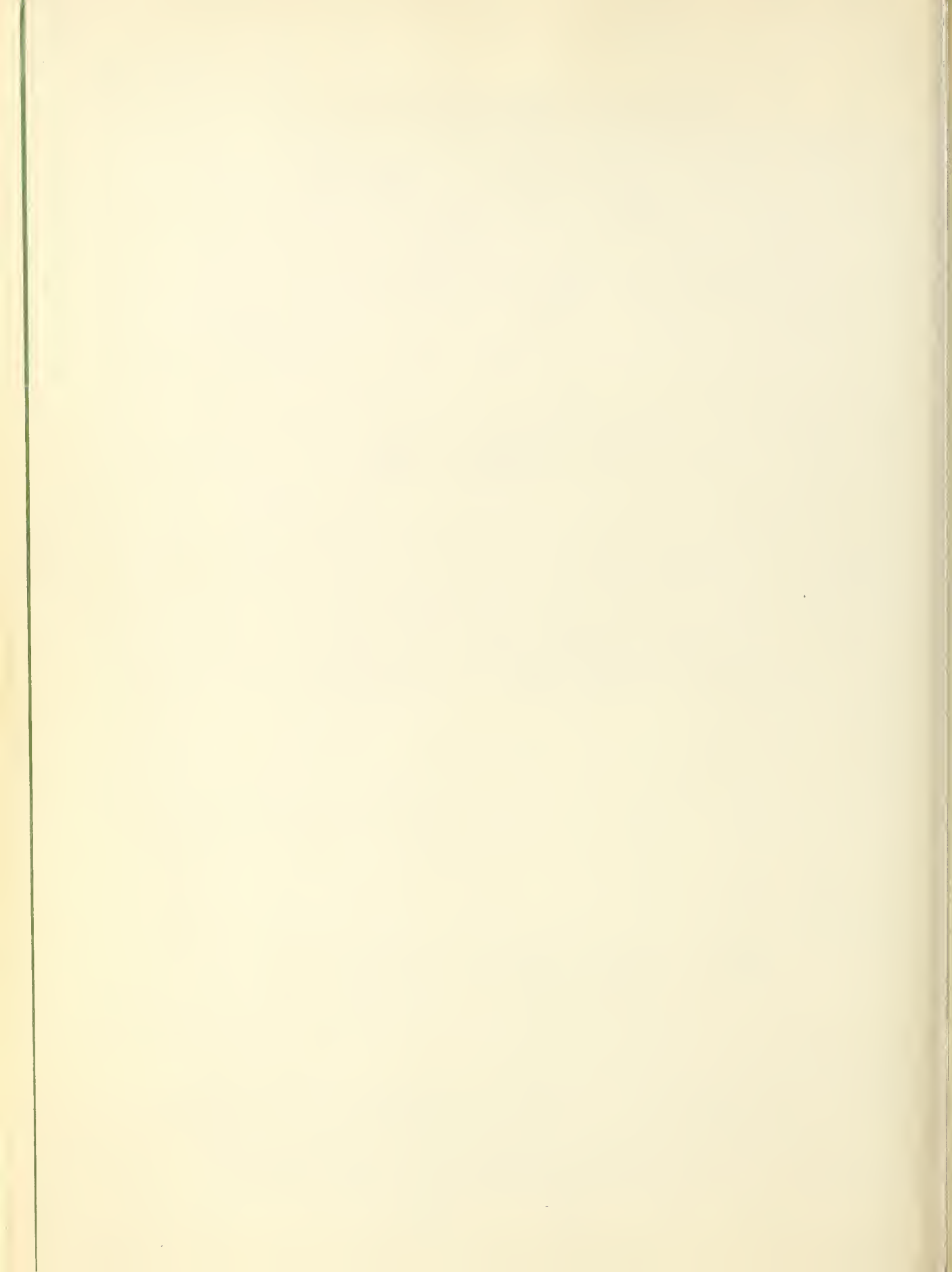
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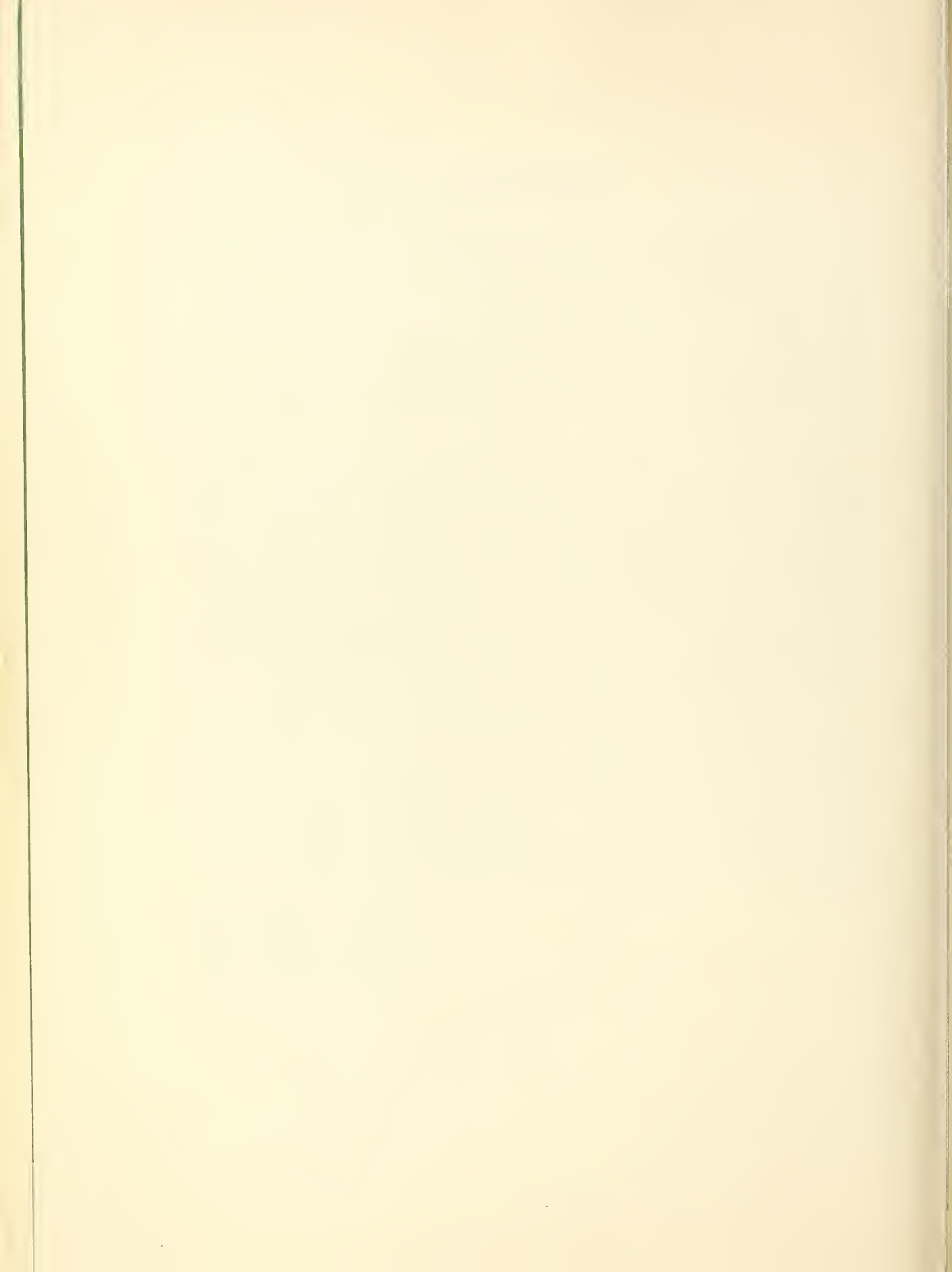
FOREWORD

This publication presents the organization and statistical procedures used by the Statistical Reporting Service in providing current primary data on the main aspects of the agricultural economy of this country. It is designed to satisfy the interest of various groups, including: direct users of the data in agriculture, industry, commerce, government, and education; students, officials, and businessmen from other countries; and the staff of the Service itself, particularly new employees and trainees.

The text is arranged so that Chapter 1 describes responsibilities, organization, and general procedures; Chapter 2 describes in general the statistical methods used by the Service; and Chapters 3 through 11 describe in detail the scope and methods involved in the various subject groupings, stressing unique estimating problems and methods. The Appendixes include examples of questionnaires in use, a short history of the Statistical Reporting Service, and laws and regulations governing the reports of the Service.

Preparation was under the direction of Richard K. Smith with the aid of a steering committee chairmaned by Orville E. Krause and including Gordon G. Butler, J. Richard Grant, John W. Kirkbride, W. Grant Lee, and Ross L. Packard. Members of the Service prepared the text, as noted on each chapter title page. Glenn D. Simpson, Chairman of the Crop Reporting Board, consulted with the committee and reviewed various parts of the manuscript.

HARRY C. TRELOGAN
Administrator
Statistical Reporting Service



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STATISTICAL REPORTING SERVICE OF THE U.S. DEPARTMENT OF AGRICULTURE: SCOPE AND METHODS

The Statistical Reporting Service is the main fact-gathering agency of the U.S. Department of Agriculture. This organization for collecting and disseminating current primary data on agriculture has been in operation for more than 100 years. During that time the name of the organization has changed several times and its job has become bigger and more vital, but its major objective has remained the same.

That objective: To report the basic statistical facts of the Nation's agriculture.

The size of the factfinding job has grown with agriculture, which today with its related industries engages three-tenths of all employed persons in the United States.

Today this Nation's agri-business includes:

- Farming, the Nation's largest industry, which has an annual production valued at \$36 billion, uses more than a billion acres of land, and employs about 6.5 million workers. This production includes nearly all agricultural commodities that can be produced in the Temperate Zone, including 58 billion pounds of meat animals, 125 billion pounds of milk, 63 billion eggs, 4 billion bushels of corn for grain, 1.2 billion bushels of wheat, 2 billion pounds of tobacco, and 15 million bales of cotton. Produced in smaller amounts are numerous other field crops, vegetables and fruits for fresh market and for processing, nuts, oilseed crops, and nursery products and other horticultural specialties.

- Industries that process and distribute farm products, which employ about 10 million workers.

- Industries that process and distribute the \$17 billion worth of production goods and services bought by farmers. These industries employ about 6 million persons.

SRS publishes its findings almost daily. Some 700 reports are issued from Washington each year, giving estimates of current national and

State production, stocks, and prices received by farmers for nearly 200 farm products.

Crop reports cover 175 crops. They include estimates of acreages farmers intend to plant, acres planted, acres harvested, production, disposition, and stocks. Forecasts of production are made each month during the growing season; these are based on crop conditions and probable yield per acre as they are reported to the Service on the first of the month. Objective yield measurements are made for several crops to add to the accuracy of the forecasts.

Livestock and poultry reports include estimates of numbers of animals on hand at strategic times during the year. Other reports show farmers' production and marketing intentions and then their actual production and marketing. Yearend estimates are made of production and disposition for the year's output of all livestock and poultry industries.

Dairy reports give periodic inventories of milk cows, monthly and annual milk production, and use of milk for various purposes on farms and in processing plants. Production of leading manufactured dairy products is reported weekly and monthly; a complete enumeration is made of the factory output of 45 dairy products annually.

Price reports show prices received by farmers for commodities they produce, prices paid by farmers for family living and production items, indexes of prices received and of prices paid, the Parity Index, and the season average price of crops, livestock, and livestock products.

Other reports, issued seasonally, include those for bees and honey, naval stores, sugar crops, peanuts processed, cold storage holdings, and wage rates and farm labor.

Location of the Statistical Reporting Service is in 45 offices—a central office in Washington, D.C., field offices in 43 States, and a dairy office in Chicago. The 43 field offices serve all 50 States.

CHAPTER 1. A BRIEF LOOK AT THE STATISTICAL REPORTING SERVICE *

The Statistical Reporting Service is one of two agencies that make up Agricultural Economics, which is one of six major units of the U.S. Department of Agriculture. The other agency in Agricultural Economics is the Economic Research Service, which administers research programs in agricultural economics and marketing analysis and development.

SRS has three main areas of responsibility:

1. Crop and livestock estimates. This area is the main subject of this publication; the scope of these estimates is described herein, along with the organization of the estimating work and the methods used.

Work in this area includes: Making estimates of production, supply, price, and other aspects of the agricultural economy. Conducting enumerative and objective measurement surveys. Preparing and issuing official national and State estimates and reports of the Department (as listed previously) relating to crops, livestock, dairy, prices, and miscellaneous data.

2. Statistical research and service. Work in this area includes review, clearance, coordination and improvement of statistics in the Department; research on the development of improved statistics in the Department; research on the development of improved statistical techniques used in gathering and evaluating statistical data; data processing activities, related systems analysis and research, and programing and processing of data; research on consumers' preferences for foods and fibers and their evaluation of quality, costs, and other factors involved in purchase of these products; and research projects conducted overseas by foreign research institutions under Public Law 480, the results of which are used to gain a better understanding of the market potential for U.S. products abroad.

3. Services for other agencies. This work is done on a reimbursable or advance payment basis and includes collection and analysis of data on various agricultural subjects for a number of De-

partment and other Federal agencies, as well as for State agencies and private organizations.

ORGANIZATION

Three divisions and the Crop Reporting Board make up the Statistical Reporting Service. The three divisions are Agricultural Estimates, Field Operations, and Standards and Research. All report directly to the administrator of the Service. (See fig. 1.)

Crop Reporting Board

The Crop Reporting Board prepares and issues on specific dates the official agricultural statistics, estimates, and reports of the Department of Agriculture. It has a permanent chairman (the deputy administrator of SRS) and a permanent secretary.

Other members of the Board vary from report to report. They are appointed for each report on the basis of their special knowledge and experience; usually at least two are from field offices and two from the Washington office staff.

The Board has an office staff and is located in Washington, D.C.

Agricultural Estimates Division

The Agricultural Estimates Division, located in Washington, D.C., is responsible for the preparation of basic plans for crop and livestock estimating and reporting programs and for the technical aspects of these programs.

This responsibility involves: collection, analysis, and interpretation of sample data; preparation of estimates, forecasts, and reports of production, supply, price and other aspects of the agricultural economy; and related activities. It includes specification of procedures to be followed in agricultural estimating activities performed by the Crop Reporting Board and State statistical offices in the preparation of official State and national estimates.

*By Orville E. Krause, Emerson M. Brooks, and J. Richard Grant.

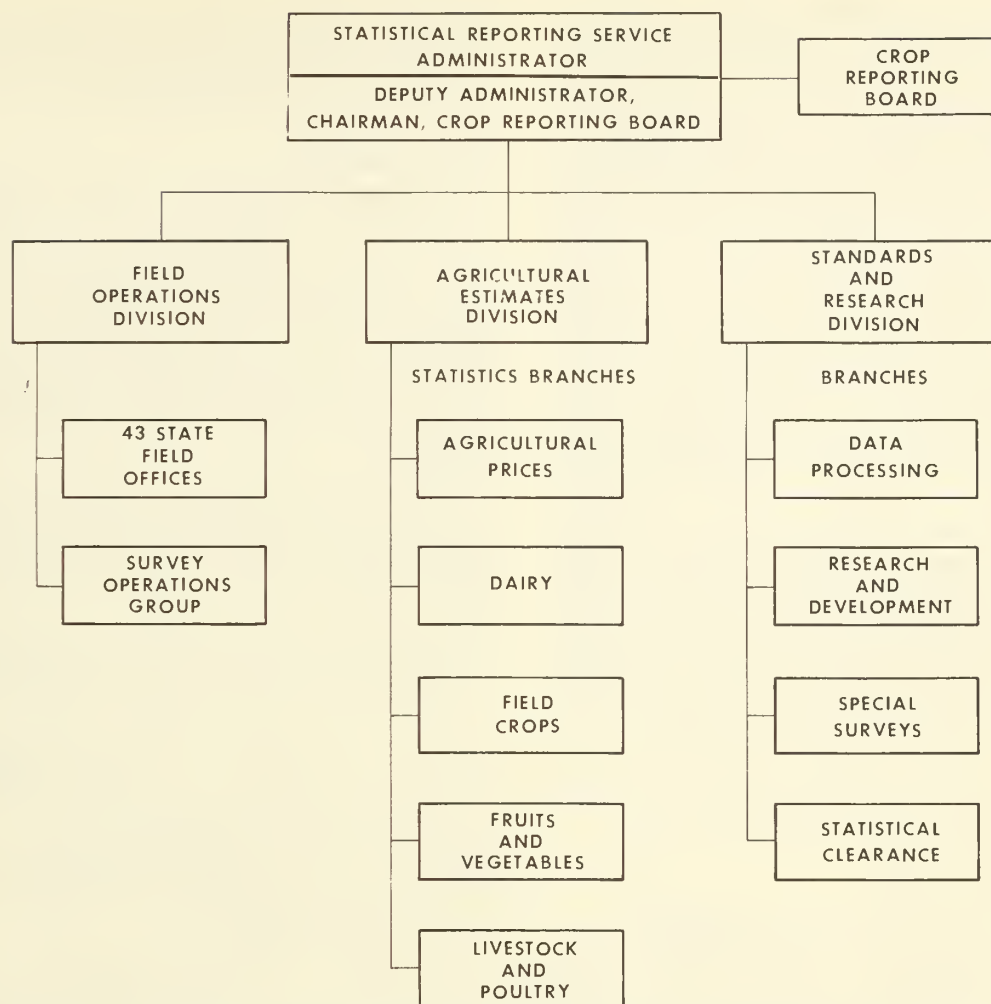


FIGURE 1.—Organization of the Statistical Reporting Service of Agricultural Economics, U.S. Department of Agriculture.

This division works closely with the Secretary and Chairman of the Crop Reporting Board and with the Field Operations Division and the Standards and Research Division in programing work and in determining the technical methods to be employed in all operations relating to or contributing to the statistical reports released by the Board. This work includes review and evaluation of program operations in order to appraise the effectiveness of programs and policies and taking appropriate action to correct program deficiencies.

To carry out these responsibilities the division is organized into five statistics branches, namely: Field Crop, Fruit and Vegetable, Livestock and

Poultry, Dairy, and Agricultural Prices. Thus, the branch chiefs become responsible for carrying out in their respective assigned areas the above responsibilities of the division in conducting and improving the estimating program.

Field Operations Division

This division includes two offices located in Washington, D.C.—those of the Director of the division and the Survey Operations Group—and statistical offices located in 43 States.

Responsibilities of the office of the Director include: directing the administrative aspects of the crop and livestock estimating and reporting programs carried out by the State statistical offices;

and participating with key officials of SRS in formulating long-range and current policies relating to crop and livestock estimating and reporting programs, particularly as they relate to the administrative aspects of these programs.

The division conducts the enumerative and objective measurement surveys that are part of SRS programs and makes similar surveys in cooperation with other Department and Federal agencies. In doing its work the Field Operations Division collaborates with the Agricultural Estimates Division and the Standards and Research Division in coordinating and improving methods for collecting and evaluating statistical data. This includes review and evaluation of program operations to appraise effectiveness of policies and programs, determining possible program deficiencies, and taking or recommending appropriate actions.

Other responsibilities of the Division include: developing and maintaining cooperative crop and livestock estimating programs with State agencies; participating in training programs in agricultural estimating for foreign technicians; and cooperating with the Economic Research Service in arranging training activities for other foreign visitors to the Statistical Reporting Service.

Survey Operations Group

This group administers and supervises the enumerative and objective yield surveys. These surveys are designed in accordance with probability theory to obtain estimates with a known degree of precision. This responsibility involves preparing samples and designing questionnaires and planning, organizing, and coordinating the field operations for these surveys. This work is done in collaboration with the field offices and with the other SRS divisions.

Field operations for these surveys, as for most surveys, are carried out by the field offices of the Division. A member of the State field office staff is appointed as State supervisor to conduct the field operation of the surveys, under the supervision of the State Statistician and in line with procedures and instructions supplied by the Survey Operations Group. A part-time enumerator corps does the field work; this corps is maintained by the State field offices.

The Survey Operations Group is also responsible for conducting special enumerative surveys

made in cooperation with other Department or Federal agencies and for performing or arranging for the processing and analyzing of data for surveys under its direction.

State Field Offices

The State field offices are the primary data collecting and estimating units of the Service for most surveys. Following prescribed procedures they conduct surveys and recommend statistical estimates for their respective States to the Crop Reporting Board in Washington. These estimates, after review by the Board, become components of the national tables showing data by States.

This decentralized plan for making national estimates was developed on the assumption that statisticians located in field offices could best adapt general procedures to the varied local circumstances.

Other major responsibilities of the field offices include public relations and service, maintaining a corps of voluntary reporters and a corps of part-time enumerators, and experimenting with improved technology. Also, in most States the field office conducts associated State fact-collecting programs under official cooperative agreement with the State Department of Agriculture or other appropriate agency.

In public relations, the field offices establish and maintain good relationships with voluntary reporters, producers and the trade generally, and all other interested groups—to gain their full cooperation in making the reporting service useful and dependable. The field offices also make maximum use of press, radio, television, personal contacts, and other media for wide dissemination and use of the currently reported facts on the State's agriculture.

Data collection work of the Service is centered in the State field offices. It includes voluntary mailed sample surveys, producer and processor reports, and enumerative and objective yield probability sample surveys for selected items at strategic times of the year.

The 43 State field offices serve all 50 States. The Massachusetts office serves the six New England States. The Maryland office serves both Maryland and Delaware. The Utah office serves both Utah and Nevada.

Most of the State offices have a cooperative agreement with a State agency to combine resources to do agricultural data work. This arrangement eliminates duplication of effort and makes it possible to cover more subjects and to cover each subject more intensively. In general, State funds make it possible to prepare and publish agricultural information by counties or other areas within the State.

There are now in effect cooperative agreements covering the general crop and livestock reporting work with 38 State departments of agriculture and 6 State agricultural colleges, universities, or experiment stations (fig. 2). Additional cooperative agreements covering dairy manufacturing statistics are in effect with 29 State departments of agriculture and 1 State agricultural college. In four States there are no cooperative agreements between a State agency and the State office; in two more States agreements cover only dairy manufacturing statistics. In these six States no regular crop or livestock reports are

issued by a State agency; the crop and livestock reports for these States are the responsibility of the Statistical Reporting Service.

Standards and Research Division

The Standards and Research Division is responsible for statistical standards, methodological research, special consumer surveys, and automatic data processing. This division, located in Washington, D.C., is divided into four branches.

Although some of the work of this division concerns areas other than agricultural estimates—which is the main subject of this publication—it is included here to complete the description of the responsibilities of the Statistical Reporting Service.

Statistical Clearance Branch

This branch is responsible for a Department-wide review of all statistical forms, survey plans, and record-keeping requirements originating in the Department that require approval by the

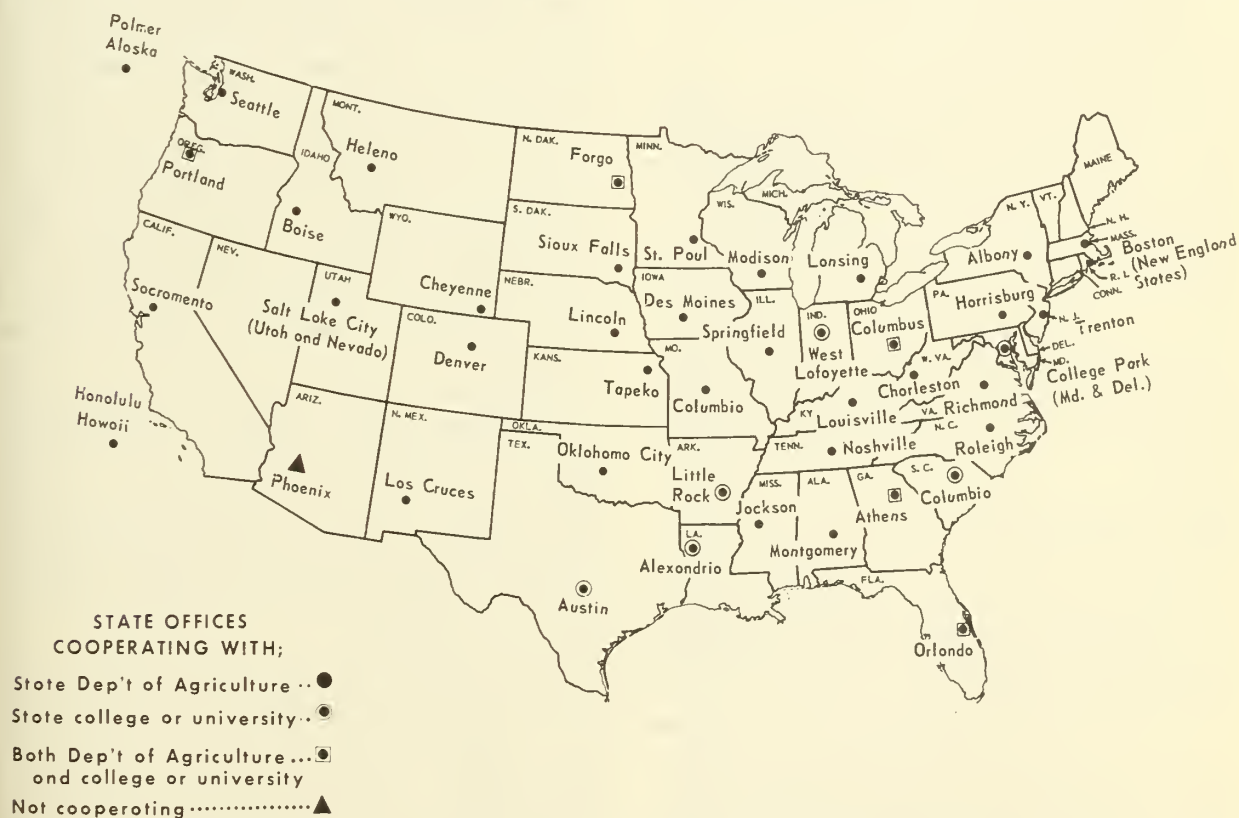


FIGURE 2.—Location of State offices of the Statistical Reporting Service and status of cooperation with State agencies, colleges, and universities. Nevada, served by the Utah office, Delaware, served by the Maryland office, and Rhode Island, served by the Massachusetts office, also do not have cooperative agreements.

Bureau of the Budget pursuant to the Federal Reports Act of 1942. The purpose of this legislation is to insure that information needed by Federal agencies from business enterprises and the public generally be obtained with a minimum burden on respondents, at a minimum cost to the Government, and without unnecessary duplication. In this connection, the branch maintains liaison for the Department with the Bureau of the Budget.

This branch is also responsible for maintaining liaison with other Government agencies on certain statistical matters. Principal activity along this line concerns the Department's interest in programs of the Bureau of the Census, particularly the quinquennial censuses of agriculture, business, and manufactures and its current survey programs.

Other activities of this branch include: conducting special studies to appraise and strengthen statistical programs; and coordinating preparation of special reports concerning various statistical activities of the Department.

Research and Development Branch

Through research this branch develops new and improved methods and techniques for collecting and estimating agricultural data and for improving statistical methods and techniques used throughout the Department of Agriculture.

Research in survey methods is concerned with all aspects of survey design. These aspects include: questionnaire design, universe definition and sampling frame construction, sample design, enumeration techniques, quality checks, editing procedures, methods of estimating (including the estimation of sampling errors) and postanalysis of surveys.

Lines of work under continuing study include: development of area sampling frames; investigation of sources of lists, their maintenance, and their optimum use as sampling frames for probability sampling; development of methodology for collecting data by mail and by enumeration in the same sample survey, using lists in conjunction with areas as frames; development and refinement of objective yield forecasting procedures for important field and tree crops; study of plant fruiting patterns in search of relations useful in forecasting yields.

This branch also carries out a continuing review of the technical methods of the Statistical Reporting Service in order to propose improvements in sampling efficiency and survey design. It recommends appropriate statistical procedures and assists as required in the installation and refinement of these procedures.

A Departmentwide consulting service in statistical methods is also offered by this branch. Statisticians are available, upon request, to advise and counsel other agencies concerning use of appropriate statistical techniques.

Special Surveys Branch

This branch conducts applied research among samples of industrial, institutional, and household consumers and potential consumers in local, regional, and national marketing areas. This research is conducted to determine: attitudes, preferences, buying practices, and use habits with respect to various agricultural commodities; the role of competitive products; and acceptance of new or improved products. Research results provide a better understanding of existing household, institutional, and industrial markets for agricultural products and the reasons for consumers' decisions to purchase or not to purchase.

This branch also conducts laboratory and field experiments in sensory discrimination of different qualities of products. The results of discrimination and taste preference tests are used to predict levels of such quality characteristics as flavor and texture that are needed to satisfy consumer demands.

On request, this branch provides consultants and conducts special studies for other agencies within the Department of Agriculture or the Federal Government. These services are provided when survey methods can be usefully applied to the evaluation of programs, services, or regulatory procedures of interest to the requesting agency.

Data Processing Branch

This branch operates the Department's Washington Data Processing Center. It provides data processing service not only to the Statistical Reporting Service but to the Economic Research Service and other Department agencies in the Washington area. This service consists of problem definition, systems analysis, computer pro-

graming, processing of data, scientific computations, compilation of tables, and other services involving use of automatic data processing equipment, including medium-scale digital computers, associated electronic accounting machines, and an automatic data plotter.

PERSONNEL

More than 1,300 persons make up the Statistical Reporting Service; 900 of these are stationed in State offices and the remainder are in Washington, D.C. An additional 800 part-time employees do enumerative work from time to time during the year. One full-time employee in five is a State employee, paid entirely by a cooperating State agency.

About one-third of the full-time employees are agricultural statisticians, two-thirds do clerical and administrative work.

Practically all personnel paid from Federal funds have Civil Service status.

In order to qualify for a job as an agricultural statistician, a person must have: A college degree; 15 semester hours of statistics or one of several combinations of statistics and mathematics; and 15 semester hours of agriculture or agricultural economics.

To qualify for various clerical jobs, the candidates need such skills as typing, stenography, or ability to operate one or more business machines.

Newly appointed statisticians are ordinarily assigned to a field office first. There under the supervision of the statistician in charge they learn the rudiments of agricultural estimating procedures. The employee who makes satisfactory progress after at least 2 years of this training may be moved to another State office with a somewhat different set of estimating problems. There he gains experience for another 2 or 3 years. His later assignments will depend on his demonstrated abilities and the needs of the Service. He may spend 2 years or more in Washington where he may be assigned to one or more positions to broaden his experience prior to a return to a field office, perhaps as second in charge.

To augment the training of the statistical staff the Service offers correspondence and short courses in statistics for both field and Washington personnel. In-service training courses are frequently given in Washington; also a wide

selection of statistical courses are available in the Department's Graduate School. Several statisticians from the Service are assigned each year to a major university for a full year of graduate study in mathematics and statistics.

GENERAL PROCEDURES

To assure success of the overall operation many procedures have been standardized by the central office in Washington. These include both general procedures and specific statistical procedures. Statistical procedures which have been standardized are described in detail in later pages of this publication. The major general procedures which have been standardized include:

1. The Washington office prescribes the survey methods to be used, the questionnaires, and the methods of summarizing and analyzing survey information.

2. Permanent records of survey data, State Statisticians' recommendations, and official forecasts and estimates are maintained in both State and Washington offices in order to guard against loss. To minimize the possibility of differences between the two sets of records, official summary forms are used for sending information to and from Washington.

3. Internal checks are built into the statistical procedure wherever possible to assure accurate computations. When checks can't be built in, computations are checked independently by a second worker.

4. Reports are rigidly scheduled. Before the beginning of each year release dates are announced for all reports to be issued within the year. Thus the press and radio and all who use the statistics can depend on appearance of reports at a given hour on a given day.

5. Statistics are never published that reveal answers supplied by one individual or concern, except by permission. If statistics furnished by two or three individuals or concerns are such that subtraction would reveal the statistics of only one, statistics are not published without the consent of all the parties involved.

6. Strict precautions are taken to prevent premature release of official forecasts and estimates in order to keep speculators in agricultural commodities from using such information for their own gain. All employees of the Statistical Re-

porting Service are forbidden by law to speculate in agricultural commodities.

ISSUING A REPORT

The main steps in production of a crop report can best be illustrated by following the progress of a typical report from scheduling to publication. Take, for example, the August Crop Production report, starting in a typical State office.

In the State office. At the beginning of the year the State office receives the year's schedule that specifies August 6 as the date for getting the State survey data and recommendations for the August Crop Production report to the Washington office and August 10 as the date for release of the report.

No later than mid-July a supply of August Farm Report questionnaires is received by the State office from Washington, D.C., along with any special instructions that apply to this report. General basic instructions for preparation of most scheduled reports are in an instruction manual on file in the State office.

From about July 25 to July 27 the questionnaires are sent to each of the crop reporters on the typical State's mailing list of about 2,500. With each questionnaire goes a franked return envelope.

About the end of July, the answered questionnaires begin to come in to the State office. They are sorted by crop reporting districts (State subdivisions within which the type of farming is similar) then by counties within each district. Information on the questionnaires is edited and the various counts, totals, and averages are summarized for the State.

During July also the State office, cooperating with the Survey Operations Group, makes an objective yield survey of the corn, cotton, and soybean crops of the State. In early July the office selects the sample fields to be included in the sample. Then during the last week of July enumerators visit the sample fields and obtain data on potential yield by interviewing the farm operator and by making special observations, counts, and tests of small plots at random locations in the field.

During the last few days of July and the first two days of August statisticians in the State office usually travel to the more important crop-produc-

ing sections of the State or to areas where weather or insect damage may be significant. They observe crops and talk with farmers and with other informed persons, such as operators of grain elevators, county agents, local farm supply dealers, and representatives of farm management services.

When they return to the office the statisticians pool their observations and information gained from conversations. In light of this additional knowledge, the indications derived from the summary of the returned questionnaires and from the objective measurement survey are interpreted.

By techniques discussed in this publication a State Statistician's recommendation is made for each item required by the instructions for the August Crop Production report. These recommendations are written on the Statistician's Summary sheet. Comments on each item or group of related items are written on special forms—separate forms for each. The comments are general statements on the month's weather and its effect on crops, farm employment, and other items being estimated. They also include statements on the progress of various crop operations, the stage of maturity of unharvested crops, the statistician's appraisal of survey indications, and his interpretation of all available data.

Speculative crops for speculative States are handled somewhat differently from other reports. These crops are corn, wheat, oats, soybeans, and cotton; they are designated as "speculative" because they are traded in large volume on the organized commodity exchanges. "Speculative States" for the crops in question are individual States, or groups of States, in which the production of a speculative crop is so great that forecasts or estimates of production are highly correlated with the country's total production. These States are listed in Appendix D. Crop Reporting Regulations. A report on a speculative crop by a speculative State is designated a "speculative crop" report—and is processed with extra security precautions. All others are designated as "nonspeculative" reports.

Summaries and comments are prepared first for nonspeculative crops; these are sent to the Crop Reporting Board in Washington, D.C., in time to be there by 9 a.m. August 6.

After summaries and comments on nonspeculative crops have been mailed, the statisticians in

the State office turn their attention to the speculative crops. For these, they prepare summaries and comments which are entered on a special form and sent in a special envelope to the Secretary of Agriculture in time to reach Washington by 10 a.m. August 9. When the envelope reaches Washington it is put in a special mailbox that is secured by two locks and kept in a locked room.

In the Washington office. Preparatory work on the August report begins in early April. Questions to be asked the farmer reporters are decided upon and incorporated into a questionnaire, which is first approved by the Bureau of the Budget then printed at the Government Printing Office.

Well before the reports and recommendations are due in Washington, the many necessary preparations for release of the report begin.

Computation sheets are prepared—one for each commodity. The acreages for harvest that were estimated in the July Crop Production report are transferred to these sheets. Additional sheets are prepared to show estimates for past periods, such as last year or 5- or 3-year averages.

As soon as nonspeculative reports are received they are opened and work starts. All material is sorted by commodity, placed in a commodity folder, and filed in the office of the Secretary of the Crop Reporting Board when it is not being used.

One copy of each summary goes immediately to the computing unit, which transfers information from it to the commodity computation sheets.

Commodities to be reviewed are furnished to the commodity specialists of the Crop Reporting Board. Using much the same techniques as the statisticians in the States, they review all of the material in each commodity folder and arrive at their own recommendations for each commodity assigned to them.

When their recommendation does not agree with the State Statistician's recommendation, they make out a form showing the preferred estimate and giving reasons for nonagreement. All changes are approved or disapproved by the Chairman of the Crop Reporting Board or his designated representative. Comments on nonspeculative commodities to be published in the August Crop Production report are prepared by Board members as soon as the estimates to be published are adopted.

The envelopes containing State summaries of the speculative crops remain in the locked mailbox until early on the morning of the release day of the crop report—August 10.

About 6:30 a.m. on that day three Crop Reporting Board members and a representative of the Secretary of Agriculture go to the locked room containing the mailbox. They are accompanied by an armed guard. Of the three Board members present, one is the Chairman, one is the Secretary, and the third is usually a member from a field office.

The Secretary of the Crop Reporting Board has one key to the mailbox, the representative of the Secretary of Agriculture has the other. They unlock the mailbox, remove its contents. Then the members of the Board, accompanied by the armed guard, take the reports to the "lockup" area, where the crop report will be prepared.

The lockup area is a corridor of offices that can be locked off from the rest of the building by doors at both ends of the corridor. In this area all window blinds have been closed and sealed, all telephones have been disconnected. Guards are stationed outside both locked doors. They admit only persons who carry special passes. They allow no one to leave until the doors are unlocked at 3 p.m.

Within the lockup area the speculative reports are removed from envelopes and placed in folders—one folder for each State for each commodity. Each Board member makes his own interpretation of the data for each of the speculative commodity items for each of the States. The Chairman of the Board reviews these recommendations and if there is disagreement concerning any item, the Board discusses and reviews the situation until agreement is reached; if no agreement is reached the Chairman of the Board decides on the official estimate.

When estimates for all States for a given crop have been adopted, these data are forwarded to the computing unit, which enters them on the computation sheet; that sheet already contains the data for the nonspeculative States. Necessary computations are made to arrive at national production and yield per acre estimates. Tables containing these data are typed on mimeograph stencils.

Each Board member writes comments on the speculative commodities for which he is responsible. These comments are reviewed and edited, then stenciled, then run off on the mimeograph. Shortly before the time of release all the mimeographed pages that make up the report are assembled and stapled.

At about 2:45 p.m. the Secretary of Agriculture or his designated representative enters the lockup quarters, reviews the report, discusses it, and signs it—thus approving it for release. Two or three minutes before 3 p.m. the Chairman and Secretary of the Board, a few Board members, and a representative of the Secretary of Agriculture leave the lockup quarters and walk under guard to the release room.

In the release room telephone and telegraph instruments are connected, and reporters from the newspapers, press services, and brokerage houses are assembled in a prescribed space out of reach of the instruments.

The Chairman places one report face down beside each telephone and telegraph instrument. At precisely 3 p.m. a representative of the Secretary of Agriculture says "Go," and the reporters rush to telephone or telegraph instruments to send out the report.

Also as soon as the report is released doors at both ends of the corridor are opened, blinds are unsealed, and telephones are connected.

A telegram is dispatched to each State office that has requested it, containing all changes for that particular State and all United States estimates. The full mimeographed report is mailed to all field offices.

In the State office again. When he receives the crop report telegram, the State Statistician completes a report containing the highlights for the State and the Nation, which is rushed to the press. Later when the full mimeographed report is received from Washington a somewhat expanded State report is mailed to each of the general crop reporters and to other interested persons in the State.

As soon as time permits, a clerk records on the permanent record card of each farm reporter the fact that a report was or was not filed by him in August. A list of reporters who did not report in August may be made so that a note or reminder

slip may be enclosed with the September questionnaire when it is mailed. The permanent record cards are reviewed once or twice a year and the names of those who rarely report are eliminated.

STATE PROGRAMS

Today the Statistical Reporting Service has cooperative programs with 44 States, as discussed in the State Field Offices section of this chapter. The work is conducted according to a standard agreement between SRS and each participating agency. Usually the participating agency is the State Department of Agriculture, but in some States it is the Agricultural College, Extension Service, Experiment Station, or a special commission. This cooperation between State and Federal agencies eliminates duplication of effort in the collection of agricultural statistics.

In 1963 about \$1.9 million in State funds were available in field offices to pay for cooperative and State programs. About two-fifths of this amount went to pay State employees who are supervised by the Federal State Statistician and work on the joint program as he directs.

The additional State funds made possible the collection of such supplementary data as statistics by counties or by commodities and special surveys of prices or commerce related to agriculture.

The three sources of funds for State programs are: Regular State appropriations; State funds appropriated to match Federal funds under provisions of the Research and Marketing Act of 1946; and industry funds provided for gathering of specific data relating to that industry.

These funds are used to provide county estimates in many States—estimates of such items as livestock numbers or acreage of major crops, yield per acre, and production. Another major use of these funds is to pay for the preparation and printing of State statistical bulletins that make most of the State's agricultural data available to farmers and others in the State who can use them to help in making important business decisions.

State farm censuses are conducted in 13 States, financed in various ways by within-State funds. In most States the SRS State Statistician is responsible for the census content and compilation.

The main purpose of a State agricultural census is to meet local demand for annual statistics on agriculture in greater geographic detail than the Federal Crop Reporting Board has funds to provide. These farm censuses have also helped materially in improving the accuracy of national estimates for corn, oats, barley, hay, wheat, rye, and soybean crops. A substantial share of the Nation's total output of these crops is produced in the 13 States that take the annual censuses.

State funds and matching Federal funds appropriated under provisions of the Research and Marketing Act of 1946 are used to obtain and provide information that will help farmers in marketing their products. Such funds have been used to provide basic data on State and local trends in production, changes in consumer demand, the competitive situation in the markets,

storage holdings, rate of disappearance of stocks, and potential production.

Some of the projects that have been financed by these funds are fruit and tree nut surveys; forest products production price reports; wheat quality surveys; small grain and soybean variety surveys; additional county estimates; commodity publications.

Industry is often willing to supply funds to State Departments of Agriculture for the collection of additional data of special interest to industry. When State offices work on such projects the data are released for the public benefit under the same conditions as any other report. Commodity groups who have most often requested this type of special service have been those producing or handling fruits, vegetables, and small grains. In fiscal year 1963 about \$200,000 was contributed by industry for these specialized types of statistics.

CHAPTER 2. METHODS OF COLLECTING INFORMATION AND OF MAKING ESTIMATES FROM SAMPLES*

The data collection program of the Statistical Reporting Service consists of a complex of surveys designed to produce current agricultural statistics of acreages, yield, and production of crops, livestock inventories, and other information pertaining to the agricultural economy. Most of this information is collected from farmers; a number of different techniques are employed. This chapter outlines in general the sources of information, survey and sampling procedures, and estimating methods that are currently in use. The treatment of these techniques is limited to a fairly general description; specific applications to particular problems are taken up in some detail in subsequent chapters which treat the various commodities.

SOURCES OF DATA

By far the most important source of current data is the farm operator who is asked to supply information about his operation. For the current estimating program, relatively few farm operators are asked to supply information. These may be regular crop reporters, respondents to a mailed inquiry; or they may be a preselected probability sample collected by personal interview, by mail, or by both methods. Aggregative data—such as measurements made by Agricultural Stabilization and Conservation Service of the acreages of crops subject to allotment, total marketings, and shipments or quantities processed—are used in the estimating procedures as check data, especially in the nonprobability (voluntary) type of mail survey. Aggregated data of this kind are used to true up current estimates in revisions made after the close of the marketing season and to remove persistent bias in current estimates by means of regression techniques.

Valuable data are also obtained through private and governmental agencies and trade associations by cooperative agreement or through

informal exchange of information. The data obtained from the United States Census of Agriculture, State farm censuses, fruit growers' associations, agencies that finance farmers' operations, railroads, irrigation projects, and the other private and governmental agencies that serve agriculture fall into this category. Such data strengthen the estimating program by providing a basis for comparing the indications obtained from voluntary mail samples and by serving as check data. Details of the way in which such check data are used are described later.

Voluntary Mail Samples

The voluntary mail sample is the most common data collection technique used by SRS. It is the chief method used to obtain current estimates of crop acreages and production, forecasts of yield, and livestock inventories. Supplementary data collection techniques used are enumerative surveys conducted in the spring and fall and objective yield surveys of some of the more important crops.

In the voluntary mail sampling farmers who are willing to cooperate are asked to supply two kinds of information: (1) data relating to their own farms and (2) data relating to agricultural conditions in their localities.

The individual-farm data concern crop acreages, crop yields and condition, farm livestock inventories, milk and egg production, and farm employment and wages. The judgment-for-the-locality observations concern agricultural conditions in the locality that are closely related to the farmer's operation and about which he has intimate knowledge, such as crop conditions and crop yields.

Early in the history of the organization, when its staff was small and the number of questionnaires that could be handled each month was

*By Bruce W. Kelly.

limited, each farmer in the sample was requested to supply information that would apply to all farms in his locality rather than to his farm alone. It was believed that this would give a more representative picture of changes in crop acreages, general level of crop yields, and other items through an increased coverage at no increase in office work or expense. Experience indicated that a farmer's lack of exact information about the changes in acreages and livestock numbers on his neighbors' farms made locality answers on those items relatively unreliable.

Voluntary mail samples fall into four general categories, the first three of which are what might be called general-purpose samples: (1) Regular monthly reporters who receive a general crop and livestock questionnaire the first of each month. The questions on these monthly questionnaires are predominantly of the judgment-for-the-locality type on crop and pasture conditions, yields per acre, and farm wages rates, but they also include individual farm observations on such items as milk and egg production, farm stocks (quarterly), and farm employment. (2) Direct-mail-individual-farm reporters who receive crop-acreage questionnaires in March on intentions to plant, in June on crop acreages for harvest, and in the late fall on acreage harvested and on production. In many States, the regular monthly reporters are also included in these individual-farm inquiries. The individual farm reporter lists are also used for many special surveys. (3) In many States, rural mail carriers of the Post Office Department in cooperation with SRS distribute individual-farm questionnaire cards to farmers along their routes three times each year—in June and December for livestock and in October for crop acreages. (4) A fourth type of sampling, "special-purpose" mail sampling, is used in making forecasts and estimates of acreage, condition, yield, or production of important commercial crops, numbers of livestock, and production of livestock products and other items for which an adequate sample cannot be obtained by general-purpose sampling.

Crop Reporters

The regular crop reporters occupy a unique position in the work of the organization. Historically, this group originally represented the

principal source of current information about agriculture at its grass roots. These reporters were, and still are, selected not so much on the basis of a mathematical sampling plan as on the basis of their ability and willingness to appraise agricultural conditions in their communities. They serve without pay, but the close personal relationship that has developed between them and the State Statisticians over the years makes them feel that they are members of the official family. This relationship is one of the most pleasant traditions of the Crop Reporting Service. Although the goal is not always reached in practice, an attempt is made to obtain the services of at least one general crop reporter in every agricultural township in the United States.

Factors other than mathematical principles of sampling have always determined the composition of the general crop reporter list. When the first such list was established, there was no theory of sampling as it exists today. Emphasis was placed on getting the services of a corps of intelligent and well-informed persons distributed fairly uniformly over the agricultural areas of the country who would report regularly. The general crop reporters thus represent a group of farmers and others in close contact with farming activities in their communities, who have better than average judgment and information. As these reporters are expected to report on many general subjects, it would be almost impossible to devise a system of allocating the number of reporters to the various parts of the country in such a way as to obtain an optimum allocation for all subjects as a whole. About all that can be done is to set up a geographic distribution of reporters within a State that is roughly proportional to the number of farms.

Other Sources

Other mailing lists of farmers that have been developed have usually been designed to get reports on some specific subject, such as cotton production, citrus fruit production, or other specialized farming activity or characteristic. Originally, such lists were usually derived by sorting out the names of farmers engaged in specific operations or having a specified type of farm from the best master list of farmers available for the

State. So far as possible, attempts were made to select those names in such a way that the number of reporters in every county or crop reporting district would be approximately proportional to the weight that the county or district carried in the State total. This was achieved by making the number of farmers selected from each geographic subdivision of the State proportional to the total number of these farmers, to the census totals of the items to be estimated, or to some similar measure. Fundamentally, the same plan is still followed, although improvements have been made gradually as better master lists and more detailed information about the characteristics of the farms operated by the individuals on those lists have become available.

In the early years, the names of farmers who might be prospective reporters were obtained by writing to postmasters or other key individuals in different parts of the State, or through contacts made by the statisticians. More recently, the development of annual State farm censuses, conducted in each of 13 States by local assessment officials in cooperation with the State Statistician, has provided excellent up-to-date master lists of names in those States, most of which are in the important farming areas of the Middle West.

In the 37 States that do not conduct an annual farm census, lists of prospective reporters are obtained from various sources. One valuable source of names of farm operators is the county agent. Another is lists of farmers compiled in connection with production control and conservation programs of the U. S. Department of Agriculture; this source is particularly useful in the South where most farmers participate in these programs. In many States, lists of participating farms kept up to date by State administrative offices of the Agricultural Stabilization and Conservation Service are made available to the State Statistician.

Rural mail carrier surveys supply one of the most widely used sources of new names. Another particularly useful source is the membership directories of trade organizations. These directories contain names of producers of specialized commodities. The lists of members of fruit growers' associations, poultry improvement associations, and the like fall into this category. State license

and inspection records and similar materials are also used as sources of names, particularly for those of manufacturing and processing plants.

SAMPLING FRAMES

In order to conduct a survey, the desired items of information must be clearly defined and grouped in logical order according to the purposes of the survey and the source of information. The population (or universe) also must be defined and organized so as to enable either complete enumeration or to permit the use of sampling techniques. If it is a sample survey, a suitable sample must be designed and drawn, and the data collected from all elements drawn in the sample. If data are collected by personal enumeration, the enumerators must be trained and supervised during the collection process, data must be edited, and estimates computed by processing the data according to the sample design and estimating procedures prescribed. In probability sampling, the survey design will often include a quality check to provide measures of non-sampling errors.

The organization of the universe is usually called a frame. The frame must provide for the identification of each element of the universe so that sampling can be accomplished and the survey controlled. Frames are of two basic types: area and list.

A list frame, as the name implies, is a listing of the elements of the population, along with appropriate identifying data. Supplementary information which allows classification of the elements may be included as part of the frame. A list frame consisting of the names and addresses of farm operators is well suited to the collection of agricultural information by mail. The low cost of data collection by this means constitutes one of its principal advantages. Another advantage is the ease with which supplementary information may be utilized in designing a sample. The main disadvantages of the list frame are the difficulty of compiling a complete list and the difficulty of adjusting the list for changes that occur in the universe.

An area frame consists of an aggregation of identifiable units of land area (segments) to which the universe of interest may be associated

and which may be sampled by drawing subsamples from segments. There are at least three different concepts that have been found useful in associating agricultural activity with the area frame. These are the open segment, the closed segment, and the weighted or open-closed segment. In the open segment, the farms with headquarters located inside the segment boundaries are considered a sampling unit and all agricultural activities are associated with the headquarters regardless of whether the activity itself is inside or outside the boundaries of the segment. The closed segment associates the agriculture with the segment itself; it includes all that lies inside the segment boundaries but excludes all that does not. The weighted or open-closed segment is a combination of the other two in that all agriculture associated with the farms, any part of which lies within the segment, is attributed to the segment according to the fraction of farm acreages that is inside the segment. For characteristics which are associated with land, the closed segment has proved to be clearly superior in sampling efficiency. But characteristics which pertain to the farm headquarters, such as the economics of the farming enterprise, do not lend themselves to the closed segment. The principal reason for using the weighted or open-closed segment is to gain efficiency by reducing the variability caused by widely differing sizes of farms.

The principal advantage of the area frame is that since it consists of a listing of segments, the number of which remains constant, it is at all times complete and does not suffer the same kind of deterioration through time as the list frame because of the loss of elements of population or the gain of others which are not on the list. However, the area frame lends itself best to enumerative general-purpose surveys. It is not a feasible basis for a mailed survey because names and addresses of persons living within the segment boundaries are not known in advance. It may not be suitable for special-purpose surveys of farming because the relatively high cost of enumeration and the usual lack of supplementary information preclude the segregation of farming enterprises of a particular class.

SAMPLING TECHNIQUES

A few Statistical Reporting Service surveys are conducted as censuses; that is, information is collected from practically the entire universe. This type of survey is discussed here since it may be regarded as sampling with a 100-percent sampling rate. Usually, however, sampling implies the selection of a fraction of the elements of the universe in such a way that, for the characteristic of interest, this fraction will represent the universe and provide sample estimates of universe means and totals. SRS does both probability and nonprobability sampling.

In nonprobability sampling, considerations other than the respective probabilities of the sampling units govern the process of sample selection. Examples are the voluntary mail samples.

Probability sampling, in the strict sense, requires a complete frame from which elements or a combination of elements can be selected with a known probability. Samples selected in this way have the virtue of making possible the computation of measures of precision and reliability from the sample data alone. When unbiased sample designs and estimating procedures are used, or when measures of bias are available, generally accepted measures of the quality of the estimates can be derived from the sample. The disadvantages of probability sampling are the difficulty of assembling a frame and the necessity for eliciting the required information from each element of the sample. The determinants of the precision of a sample are sample design, the estimators, and the sample size. A good sample design which utilizes supplementary information to reduce variability by imposing restrictions on the process of sample selection will result in a comparable increase in sampling efficiency. A probability sample can be designed to obtain the maximum precision with respect to cost.

The design of a sample is an involved process which utilizes the extensive body of theory that has been developed. Considerations of variability and costs in conjunction with supplementary information may dictate restricting the process of sample selections and determine the appropriate estimating procedure. It is usually possible to achieve a marked reduction in sampling error through sample design. Thus, sample design is

one of the more important components of a sample survey.

Stratified Sampling

Although most of the basic concepts of stratified sampling have been known for years, recent developments have led to more efficient methods, techniques, and applications. The oldest and perhaps most widely used device for reducing the sampling error involves subdividing the universe to be sampled into a number of strata, and then allocating a portion of the sample to each stratum. To be effective, the strata should be formed in such a way that the individuals in any one stratum are as similar as possible with respect to the characteristics or items that are to be estimated from the sample.

It has long been recognized that farms tend to differ from one part of a State to another. Consequently, a geographic stratification was adopted long ago and is still in use. Every State is subdivided into crop reporting districts, the boundaries of which tend to follow lines of demarcation between different groups of farm characteristics but do not cut across individual counties. The general pattern calls for nine such districts per State, but the number is smaller in some States and slightly larger in others. These districts have been used for many years by the Statistical Reporting Service. A similar set of price reporting districts, the boundaries of which ordinarily but not always coincide with those of the crop reporting districts, has also been used for years in summarizing returns from retail stores and handlers of agricultural products. This set allows for regional differences within a State in prices farmers pay for things they buy and the prices farmers receive for farm products.

Stratifications of this kind are fairly easy to work out and use. In drawing samples of processing plants or samples of farms for some special types of estimates, a stratification based on the scale of operations of every individual in the universe is sometimes used. This method has been particularly useful when data for individual farms or firms are available. It is efficient for selecting samples of storage, processing, and manufacturing plants, because data are usually available to permit the classification of all plants in the universe into size groups. Rated storage

capacity is used as the measure of size for mills and elevators, and volume of output during a specified base period is used as a measure of size for processing and manufacturing plants.

Similarly, farms may be stratified on the basis of size, where information about land in farms, production of a specified commodity during a base period, or some other pertinent characteristic is available for use as the measure.

The problem of selecting individual sampling units within strata has been the subject of considerable study and discussion. According to mathematical sampling theory, individual units should be selected from every stratum by a process that discloses the probability of selection for every unit present in the stratum. In ordinary random sampling within strata, this reduces to the requirement that if n units are to be selected from a stratum every possible combination of n that can be formed in the stratum must have an equal chance of being selected. This requirement is met if units are selected one at a time until a total of n is reached, provided every individual unit remaining in the universe at any time has an equal chance of being selected on each draw. The application of principles of stratified probability sampling is subject to many variations and modifications, which depend on circumstances. One interesting application consists of stratifying the universe according to a measure of size with differential sampling rates in the various strata.

The principle involved is fairly simple. For example, in selecting a sample of mills and elevators for making periodic estimates of wheat stocks, the universe can first be stratified geographically to make sure that all areas are represented in the sample. Because a large plant has more effect on the total stocks than a small plant, the sampling process is controlled in such a way that large plants have a heavy representation in the sample. A simple method of arriving at such a sample is to select all the large plants deliberately and to confine the random selection process to the remainder. This is, in fact, a procedure used when sufficient information about the universe is not available to permit further refinements, or when a few plants have nearly all of the storage capacity, or when further refinements

would require more work than the office can handle.

A more refined approach, which is sometimes used when facilities permit, involves the stratification of establishments on the basis of size and random selection from each size group. The number of establishments to be selected from each size group is controlled so that each group is represented in the sample in its correct proportion for maximum precision, just as in any ordinary problem in stratified sampling. Sometimes the great variation in size of establishment makes grouping into strata on the basis of size awkward and rather ineffective. There may be so few establishments similar in size that it is difficult to decide on a grouping, and, no matter what grouping is finally adopted, the variability within groups may be so large that sampling error is not controlled effectively by the stratification. Under such conditions, random selection of establishments with probabilities proportional to size, rather than with equal probabilities, is effective.

In such cases, instead of grouping all establishments into strata on the basis of size, no grouping is attempted at all. The sample is selected from the original list as it stands, but every sample is given a probability of selection proportional to its size. Thus, if an establishment on the list is 10 times as large as the smallest, it will have 10 chances of being selected for every chance that the smallest has. In a sample drawn by selecting establishments one at a time by this method, it is obvious that the larger establishments will tend to be heavily represented. This process has about the same effect as an efficient size-group stratification with higher sampling rates applied to the groups containing the larger plants.

Subsampling

In a mail survey, if enough information is at hand to set up a detailed stratification of the universe with an optimum allocation of sampling units to the individual strata, there is every reason for taking advantage of such a sample design. But for an interview survey or interview follow-ups on samples of nonrespondents to a mail survey, consideration of costs may not permit the allocation of individual sampling units at random

to all strata. Some way of clustering sampling units and perhaps of subsampling may be required to provide optimum efficiency for a specified expenditure. Subsampling, or two-stage sampling, consists of first grouping the individual sampling units into clusters of primary sampling units (often quite large), drawing a sample of the clusters, and then drawing a sample of individual units from each sample cluster. Many surveys of farms that have been conducted by means of subsampling have used counties as primary sampling units. At the first stage, a sample of counties is selected; at the second stage, samples of farms are selected from these counties.

Stratified sampling and subsampling may be combined by first grouping the primary sampling units into suitable strata, drawing a sample of primary units in each stratum and then a sample of individual (secondary) units to the sample of primary units. The subsampling is done independently in each stratum which may be thought of as a subuniverse. When counties are used as primary sampling units, the county-to-county variation is generally rather large and contributes heavily to the standard error of a per farm average. Various devices have been introduced to minimize the contribution of this component to the total sampling error. One device is to attempt to classify all counties into extremely homogeneous groups before selecting the sample counties. Another is to make use of census county data as a control in computing the estimates. The estimating process then proceeds in two stages: (1) the individual farm data are expanded to an estimate of total for the subuniverse of sample counties, and (2) the ratio of this total to a corresponding total in a previous census year is computed and multiplied by the State total for the previous census year, to arrive at the final State estimate. If the correlation between county totals in successive years is high, the use of this ratio estimate practically eliminates the effects of the component of variance between counties.

Another form of subsampling involves selecting the primary sampling units with probabilities proportional to size, which is the magnitude of any item of information that is known about the sampling unit. A special case of subsampling

with probabilities proportional to size is of interest.

When primary sampling units are drawn with probabilities proportional to the number of secondary units they contain, and the same number of secondary units is drawn from each primary unit, then the sample is self-weighting with respect to the secondary unit. For example, if counties (the primary sampling unit) are drawn with probabilities proportional to the number of farms each contains, and a subsample consisting of the same number of farms is drawn from each of the sample counties, then the sample of farms is self-weighting, and unbiased estimates of per farm averages for the different items of information can be computed by dividing the aggregated items by the total number of farms in the sample. Variance components can also be estimated from the sample data in the usual way, and estimates of the variance of the sample mean may be readily computed. The Statistical Reporting Service uses this form of subsampling with unequal probabilities in drawing sample yields for objective yield observations. The procedure is described in the section on the Current Program of Objective Yields later in this chapter.

ESTIMATING PROCEDURES

After a survey has been made and the raw data have been tabulated, the statistician prepares the desired estimates. These estimates are the end product. How accurate they are usually depends on the design and size of the sample itself, the accuracy with which the data for the individual sampling units have been obtained, and the adequacy of the methods used in deriving the estimates from the raw data.

The choice of a method for translating survey data into an estimate involves technical considerations. Generally, more than one method is available and the problem is to choose the particular one that will give the best results under the given conditions. Since most of the surveys that are conducted by mail are nonprobability samples based on incomplete frames which tend to be selective as well, the methods of estimation have to be such that, so far as possible, the resulting biases are removed from the final estimates.

Regression Charts

One of the simplest devices for translating sample data from mail surveys into an estimate, and the method generally used by the Statistical Reporting Service, is to prepare a chart from past data showing the relation between sample indications and corresponding "true values" of quantities estimated. Since persistent bias may be removed by regression techniques, such a chart can then be used to estimate the most probable value of the quantity to be estimated from the sample indication. Ordinarily, results from complete census enumerations or from some other independent source provide the true value to which sample data relating to the same date or period are to be compared.

A typical procedure for estimating crop acreages from a voluntary mail sample by means of chart relations includes a "ratio to land" as an estimator. This procedure is illustrated by describing the manner in which the acreage of a typical field crop for harvest in a typical State is estimated.

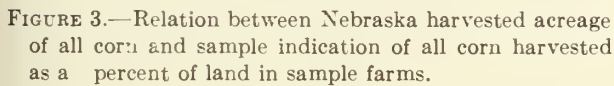
The questionnaires that are completed and returned to the State Statistician in response to a mailed inquiry are tabulated by crop reporting districts. Then for each crop reporting district the sample total acreage of the specified crop is divided by the sample total farmland acreage and multiplied by 100, to express the reported crop acreage as a percentage of the farmland acreage in each district. These district ratios to land are then combined into a weighted State average percentage ratio in which the most recent data available on the total farmland in each district are used as weights. These weighted State average ratios are shown on the horizontal axis of the chart. On the vertical axis are shown the total acreages harvested in the State in the different years. The dots on the charts show the relation between the ratio to land, computed from the sample data, and the State acreage of the crop for each of the past dozen or more years. The acreages shown for individual years are the most accurate estimates of those quantities that are available; they are based on evidence supplied by the surveys made each year, by later complete enumerations made in some States by the local State farm census organization every year, and by the Census of Agriculture taken every 5 years,

is the nature of the sample data used to compute the ratio to land. If the ratios for past years are based on selective data, the ratio used to make a current estimate must be subject to the same kind and degree of selectivity if the regression method is to give the most accurate results. In other words, comparability must be maintained between the sample data appearing on the chart and the sample data used to make a current estimate.

A third factor affecting chart reliability is the assumption that total acreage of farmland in the State is the same at the time of the estimate as during the period covered by the data on the chart. Sometimes charts are found in which the dots show a progressive change in level from year to year. Such a trend may be caused by changes in the kind or degree of selectivity in the sample data, or by changes in the total acreage of land in farms in the State. If such trends are apparent during the period covered by the data on the chart, it is necessary to project them into the period to be covered by the current estimates. Generally, this can be done successfully, but there is always the possibility of error in assuming that a trend observed in past years will continue in the same general direction. Regardless of the estimating methods employed, the element of subjectivity cannot be eliminated completely when such trends are projected. A statistician has to make the best interpretation of the data that he can in the light of experience and the current situation.

Trend Adjustments

Methods for taking trend into account have been developed and are generally used when there is an appreciable trend in the charted relations. One such method consists of dividing the dependent variable by the independent, and plotting the resulting ratios against time. The ratio for the current year is estimated by projecting or extrapolating the resulting chart relations, and this ratio is converted into an estimate of the dependent variable by being multiplied by the sample estimate of the independent variable provided by the mail survey. If, as in the previous case, the dependent variable is acreage and the independent variable is ratio to land, a chart would be constructed by dividing a historical series of acreages by a corresponding series of



The statistician makes the current estimate by placing a transparent ruler with a hairline on the chart and moving it about until the hairline down the center of the ruler seems best to represent the relation between acreage and ratio to land in recent years. Each dot on the chart is marked to indicate the year to which it refers, so the statistician can make allowance for any time trend that may be present in the relation or special circumstances that might have affected the relation in any individual year. When the ruler is placed, the State acreage is read as the ordinate corresponding to an abscissa or the current ratio to land.

Many factors affect the reliability of an estimate derived from charted relations. First, it is necessary to evaluate the precision of the State acreage data that are given here as the true values for the charted years. Any lack of precision in the data used to represent the true values in the chart will influence the estimates derived from reading the chart. Another point to keep in mind

estimates of ratio to land, and plotting the resulting quotients against time. To make an estimate of acreage, the trend factor is projected to the current year and is multiplied by the current ratio to land. The construction of this kind of trend chart is based on the assumption that the dependent variable is related to the product of the independent variable and a trend factor. If D represents the dependent variable, I the independent, and T a factor associated with time, then the assumption is that $D=f(T)I$. $T=D/I$ is plotted against time, projected according to any apparent relation, and this value of D/I is multiplied by the current estimate of I to provide an estimate of D .

Another graphic method of considering time as a variable requires the construction of three charts. On the first chart, the dependent and independent variables are plotted, a line of regression is drawn, and the deviations of each point from the regression line are measured or calculated. On a second chart, time is plotted against the independent variable, and deviations from a regression of time on the independent variable are determined. The third chart is made up by plotting the deviations from the first chart against the deviations for the same year from the second chart, the latter being plotted on the horizontal axis. A line of regression through the paired deviations on chart three represents the average relation between the two sets of residuals. The use of these charts is simple. If the dependent variable is again acreage and the independent variable ratio to land, the regression lines on charts one and two are read for the indicated values of acreage and time corresponding to the current value of the ratio to land. The difference between the chart value for time and the actual value is the argument for reading the regression line on chart three. This value from chart three is added algebraically to the value of acreage originally read from chart one to give the current estimate.

The rationalization of the above method for taking trend into account is relatively easy. The regression lines of charts one and two describe the gross relations between the dependent variable and time to the independent variable, while chart three depicts the relation between the dependent

variable and time, excluding the effect of the independent variable on both.

Regression charts are also used for forecasting crop yield and production. There is no essential difference in technique of chart construction or interpretation. The difference lies in the kind of sample data that are collected and charted. The data upon which forecasts are based are either reported condition or expected or "probable" yield (or production). Reported condition consists of judgment evaluations by growers and crop reporters of the current crop as a percentage of a hypothetical full or normal crop. Expected or probable yield is likewise a subjective appraisal of crop prospects but expressed directly in terms of anticipated yield. Both kinds of information pertaining to important crops are collected at intervals (usually monthly) during the growing season, and chart relations are established between the historical series of the indicator pertaining to comparable intervals and final yield as determined by check data. Expected production may be expressed as a ratio to the previous year, current/current, or current/historical before charting. (See following section on Estimators.) Some of the charts for fruit production are constructed this way. Other variables such as time, soil moisture, or rainfall may be taken into account by charting techniques similar to those described in connection with acreage estimates.

Figures 4 and 5 illustrate the use of regression charts in forecasting yield. Because dispersion of the points around the line of regression in figure 4 is associated with time, it is convenient to plot the deviations from the regression line against time (fig. 5) in order to see more clearly the trend in corn yield. The use of these charts is simple. Trend is projected to the current year on the figure 5 chart, and the number of bushels attributed to trend is added to the ordinate of the regression line corresponding to the current reported condition. Had there been no trend, a single chart (fig. 4) would have sufficed. Also, trend could be adjusted by either of the short systems described in the preceding paragraphs.

Although the principles of chart construction are similar for both forecasting and estimating, greater demands are made on the forecasting charts because of the differences in the character of the charted data. In addition to removing

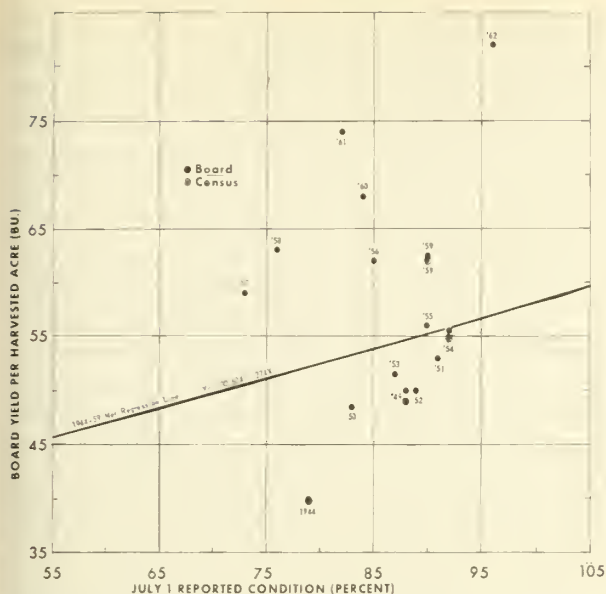


FIGURE 4.—Relation between July reported condition and the yield of Indiana corn.

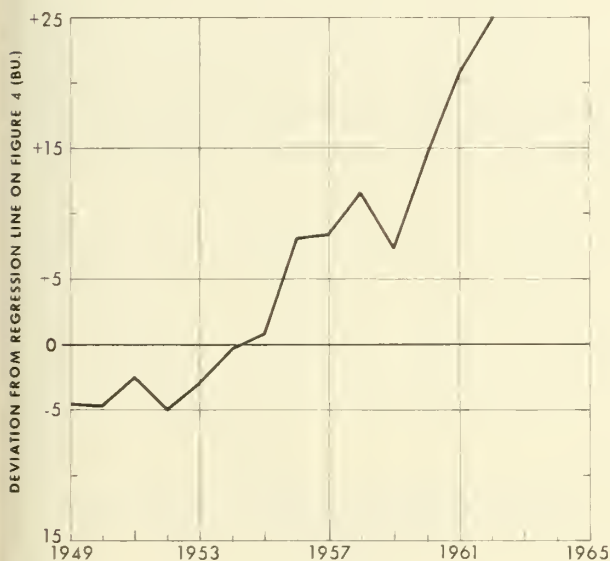


FIGURE 5.—Deviations from regression of Indiana corn yield on July condition, plotted against time.

persistent bias attributed to a nonrepresentative sample, the yield forecasting chart must also take out the effects of any tendency of reporters to consistently underestimate (or overestimate) crop potential.

Estimators

The choice of the estimator (estimating procedure) is important in the construction of

charts. The ratio to land indication in the charts described in the section on regression charts was originally introduced because expressing the individual crop acreages reported in the sample as a percentage of the farmland reported was, in many cases, an effective device for reducing the effects of sampling error in the average farm size, as well as for eliminating effects of selectivity in the sample.

It was observed that reported acreages of most individual crops tended to be at least roughly proportional to the farmland reported in the sample; also, that the ratio of a reported crop acreage to reported farmland had about the same value as the true average ratio for the State as a whole, as ascertained by the censuses, regardless of whether the average size of the farms in the sample was approximately equal to the State average size of farm. However, acreages of some crops on individual farms are often not proportional to the size of the farm or even correlated with the size of the farm. This is particularly true of crops other than the main cash crops.

It has been found in some cases that per farm averages are a more reliable indication than the ratio to land. This is generally true of the number of livestock. Computation of ratios to farmland in such instances actually introduces variability, as the farmland fluctuates from one sample to another, instead of eliminating variability. When items are highly correlated with farm size without being approximately proportional the ratio to land indication is still useful. If the average farm size in the sample tends to be consistently too high, as is generally true, the ratio will be subject to a consistent bias, but effects of this bias are removed by chart reading. It is possible to substitute a regression adjustment for the simple ratio to land to eliminate the effects of variability in farm size; but experience has shown that little is gained thereby except in rare cases in which the sampling fluctuations in average farm size tend to be large from sample to sample. It has usually been found more convenient to use some other base in preference to farmland when computing ratios, rather than to apply more refined techniques to the treatment of the ratio to land.

Sometimes acreages of individual crops which are not proportional to farmland are propor-

tional to cropland. In such cases, it is theoretically possible to use ratios to cropland in charts such as those given above. A serious disadvantage of using cropland as a base is the fact that there is more variability in crop reporters' ideas of what constitutes cropland than of what constitutes farmland. Because the advantages of the cropland base rarely outweigh its disadvantages it is seldom used.

A device often employed is to work with ratios or percentage change shown by reported crop acreage in a current year to acreage of the same crop on the same farms reported in the preceding year. This is called an "identical" indication for the crop. Charts are prepared showing the relation between percentage of preceding year computed from the sample and percentage of preceding year for the State. These charts are used to eliminate the bias that may be present in the sample ratio (fig. 6).

A modification of this procedure is found in the so-called "current/historic" indication (fig. 7). The principle is the same as for the identical indication. Instead of matching a current report with the corresponding report for the previous year, the farmer is asked to supply in the current report the preceding year's acreage of each crop

along with the current acreage. This might be expected to give about the same results as the identical indication, but it has been found that the data reported by farmers for the preceding year are often subject to error because of memory bias and other reasons. Consequently, this indication does not always serve as well as the identical, or current/current indication. In some instances, however, the current/historic indication may give better results than the current/current. When this occurs, it is attributed to the fact that: (1) the number of identical farm reports available for matching to compute the current/current indication in any one year is usually much smaller than the total number available to compute current/historic indications, (2) changes may have taken place in the previous year after the time of the survey, and (3) operators may have been in business one year but not another. Paired returns are not available for many of the farms reporting, but data for such operators are reflected in the current/historic indication, at least if they are in business in the current year.

For items that are not highly correlated with land, simple per farm averages contain less sampling variation than ratios to land or some simi-

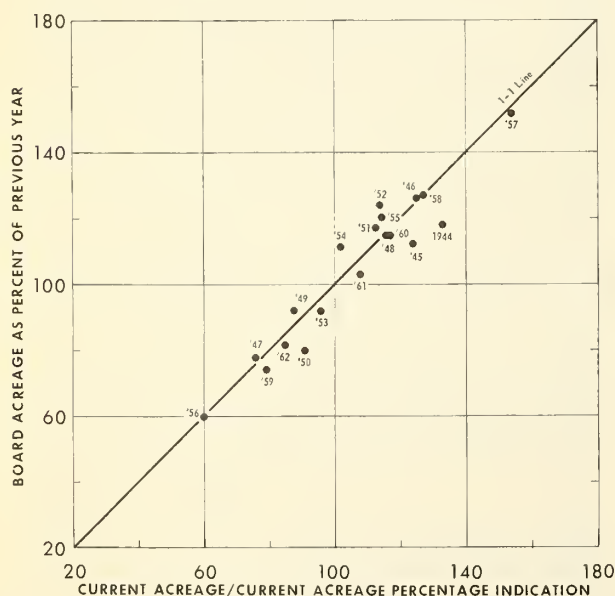


FIGURE 6.—Relation between the year-to-year percentage changes in State total acreages to the percentage change in the aggregate of June acreage reports of identical reporters, Montana winter wheat.

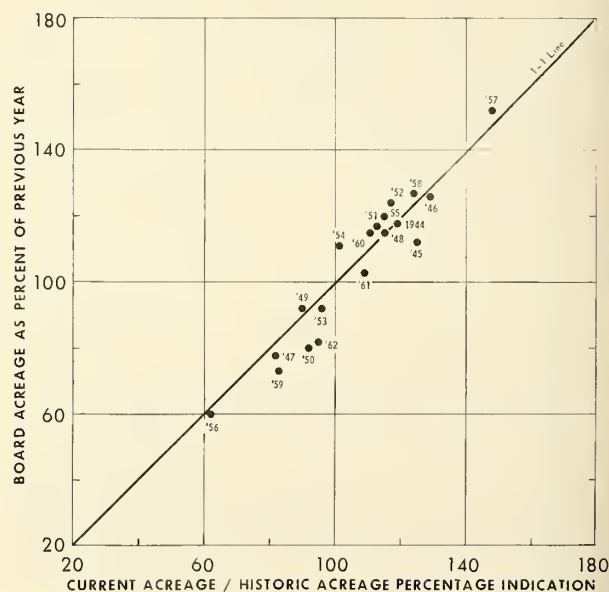


FIGURE 7.—Relation between year-to-year percentage changes in State totals to percentage changes of aggregates of the acreages as reported in the current year for both current and preceding year, Montana winter wheat acreages.

lar base. In such cases, a chart showing the relation between the average numbers per farm for the sample farms and the total number present in the State, over a period of time, provides as good an estimating tool as can be obtained from the reported data. The correlation between the item to be estimated and the item used as the base must be rather large, generally greater than 0.5, before a ratio estimator can be very effective in reducing sampling variation.

For probability samples, the estimating procedures depend on the design of the sample and the estimator being used. Ordinarily in samples of this kind unbiased procedures are used, unless an appreciable gain in efficiency can be obtained by procedures resulting in a comparatively small amount of bias.

The estimators generally used with probability samples are the direct expansion and the difference estimates, which are unbiased, and the ratio and regression estimates, which normally contain a mathematical bias that becomes negligible for samples of the size used in SRS surveys.

For probability mail surveys, the ratios and regression estimators are reasonably effective in measuring change even when the original mailing list is itself a somewhat selective sample of the universe, but the direct expansion and difference estimates are satisfactory only when the original mailing list is a representative sample. Every effort is made to eliminate selectivity in the original mailing lists, even when one of the first two methods is used, to reduce the possibility of unmeasurable biases creeping into the results from that source.

ADJUSTMENT FOR NONRESPONSE IN MAIL SURVEYS

At several points in this chapter reference has been made to selectivity in mail-survey returns and to the methods that are currently used to deal with this problem. Merely setting up a mailing list that constitutes a representative sample of the universe does not in itself solve the difficulty. Returns from a representative mailing list may be almost as selective as the returns from a mailing list that is itself a selective sample of individuals. The current methods of eliminating, or at least reducing, the effects of this selectivity are: (1) using charts showing the relation be-

tween sample indications and check data; (2) using control information to stratify and weight the returns; (3) conducting interview surveys parallel with mail surveys; (4) interviewing samples of nonrespondents; and (5) projecting returns from successive mailings to nonrespondents.

The use of regression charts to eliminate persistent bias, including that of nonresponse selectivity, has been discussed in the section devoted to regression charts.

Control Information

The use of control data is limited because of the scarcity of independent data suitable for weighting the strata. Obviously, the effects of selectivity could be reduced by grouping the reported information into a number of strata, computing stratum averages, and constructing a weighted average by utilizing the control information as weights.

Parallel Surveys

The method of parallel mail and interview surveys is not very efficient for estimating universe parameters, but may be useful for adjusting subuniverse estimates for overall selectivity. For example, a selectivity adjustment for State totals based on the results of parallel mail and interview surveys could be used to adjust a much larger mail survey, which would then be used to provide crop reporting district or county estimates.

Nonresponse Interviews

The technique of interviewing nonrespondents is of considerable importance to SRS and should become even more important as probability samples from list frames are used more extensively. The concepts involved are rather simple. There are two ways of regarding the respondents to a mailed questionnaire, depending on whether the mailing list is the universe or a sample: (1) as one of two strata in the universe, with the other stratum consisting of those who did not reply, or (2) as an estimate of the fraction of the sampling units in the universe who would have been willing to respond had they received a questionnaire.

In the first case (list is universe), the stratum of respondents is thought of as being sampled at the rate of 100 percent so that there is no sam-

pling error. A subsample of nonrespondents is drawn and interviewed, and averages computed for the two strata are weighted together by the number of units from the universe that are in each stratum. This number, for the response stratum, is obviously the number that replied to the questionnaire and the number in the non-response stratum is the total number in the universe less the number of respondents.

In the second case (list is a sample), a sample of nonrespondents is also drawn and interviewed, and averages are computed for the respondents and nonrespondents as before. However, the estimating procedure is different. The universe is regarded as consisting of two strata: those willing to respond to a mail inquiry and those unwilling to do so. The observed fraction that did respond is regarded as a sample estimate of the relative number in the universe willing to respond, and the fraction that did not reply as an estimate of the relative number in the universe who would not have responded had they received a questionnaire. The observed fractions are used as stratum weights in combining the two strata, and, except for the use of weights based on the sample instead of the population, the formulas are identical with those for stratified random sampling. The formulas for the universe mean and its variance are:

$$\bar{x} = f_1(\bar{x}_1) + f_2(\bar{x}_2)$$

$$S_x^2 = f_1^2 s_1^2 \left(\frac{1}{n_1} - \frac{1}{N_1} \right) + f_2^2 s_2^2 \left(\frac{1}{n_2} - \frac{1}{N_2} \right)$$

where f_1 and f_2 are the observed fractions of the sample of n that replied and did not reply, respectively, \bar{x}_1 and \bar{x}_2 are the estimated stratum means, and s_1^2 and s_2^2 are the stratum variances. This estimating procedure is unbiased because the observed fractions and the means from the strata are independent and the expected value of both are the corresponding universe parameters.

Successive Mailings to Nonrespondents

Another method of adjusting for nonresponse selectivity has had limited use in SRS. This method is based on three or more successive mailings and does not require interviewing of nonrespondents. In using this method it is assumed that the selectivity bias from progressively larger

samples will decrease, and that the averages from the samples of increasing size can be approximated by a modified exponential of the form $y = ax^b$. For many special-purpose surveys of limited scope, this approximation has proved to be fairly good, but it works better when a probability list or essentially a complete frame is available.

The method consists of aggregating the returns from each of the successive mailings, and computing percentages of returns and averages from the cumulated totals as the returns of each successive mailing are combined with those from former mailings. The resulting percentages and averages are converted to logarithms and plotted on rectangular coordinate paper. The reason for this conversion is that the logarithmic form of modified exponential is $\log y = \log a + b \log x$, which is linear for the converted variables. If y is the cumulated average computed after each mailing and x is the cumulated percentage of total, then their logarithms tend to plot as a straight line according to the goodness of fit of the modified exponential that is assumed to describe the relation. When the chart has been plotted, a line which best fits the points is drawn, and the chart read. The argument is the logarithm of 100 percent, and the ordinate of the line is the projected logarithm of the corresponding average.

The reliability of the preceding method is uncertain, as there is no assurance that the assumed relation will hold for a given survey. Even though multiple mailings are made, it is much safer to obtain a sample estimate of the non-response stratum than to rely upon extrapolating a relation.

Although it is not, in the strict sense, a method of coping with nonresponse in mail surveys, another concept should be mentioned in this context. This is the collection of data from a sample from a list frame by a combination of mail and enumeration. The sample is designed, and a sample of suitable size is drawn. A succession of mailings or reminders may be made in order to collect as much information as possible by mail. Then, all or a sample of the nonrespondents are enumerated.

CURRENT PROGRAM OF GENERAL PURPOSE ENUMERATIVE AND OBJECTIVE YIELD SURVEYS

At present (spring of 1964) two types of probability surveys have been developed that are likely to have considerable impact on the methodology of SRS. These are: (1) the spring and fall enumerative surveys designed to produce unbiased estimates of crop acreages, yield and production, livestock inventories, farm numbers, and other characteristics that pertain to the agricultural economy, and (2) objective yield surveys which have been instituted for forecasting and estimating the yield of corn and cotton. Both types of surveys grew out of a research program aimed at improving crop and livestock estimating methods and both are designed to provide benchmark data to strengthen the entire system of data collection.

Development of the Enumerative Survey

Because of its importance to the Service, the evolution of the present June and December enumerative surveys in SRS will be briefly traced. In 1954 an investigation of the efficiency of an area type sampling frame for estimating crop acreages and livestock numbers was started. A sample of 703 area segments from the Master Sample of Agriculture¹ was allocated to 10 Southern States. These States were: Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. Initially, stratification was accomplished by using materials prepared in 1950 which showed general types of farming by areas, and in which the sample was allocated to strata proportional to the number of farms.

It turned out that crop reporting districts were about as efficient for stratification purposes as the 1950 materials and had the additional

advantage of being used extensively for stratification in other types of surveys. However, allocation by number of farms did not prove to be very efficient. Areas containing smaller and poorer farms tended to be oversampled at the expense of larger, more productive farms. The value of products was then used for sample allocation. However, this resulted in the other extreme: too much of the sample was packed into areas growing high-valued crops and containing large farms. As a compromise, an allocation proportional to the square root of value of products was tested. This proved to be an efficient way of allocating a general-purpose sample of this type and has been continued.

In 1956 a pilot survey was conducted based on a sample of 479 segments allocated to the North Central States of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin. Kentucky and Virginia were also added to the group of Southern States by receiving an allocation of 49 and 42 segments, respectively. A year later, the sampling rate in the Southern States was increased to an intermediate, semioperational level with 1,388 segments allocated to 11 of the Southern States and 300 to Mississippi. Mississippi was thus brought up to a level indicated by the pilot survey as that required to provide State estimates with a coefficient of variation of about 5 or 6 percent for the generally grown crops.

In 1957 the enumeration of half segments was tested. Master Sample segments (containing approximately four farms each) were split into two parts; as far as possible, cultivated land, the number of farms, and total land were equalized in the two parts. The halves selected for enumeration were chosen by a random process. The half segment proved quite efficient: rel-variance was increased by only about 20 percent. Pilot work in four Mountain States was also begun that year (1957) with an allocation of 40 segments per State. It soon became evident that in this area stratification by land type and land use was essential. Consequently, it was decided to prepare a new sampling frame for the Mountain and West Coast States and Florida. Four broad strata were decided upon: Urban land, cultivated land, non-agricultural land, and grazing land. Cultivated land was divided into substrata of irrigated and

¹The Master Sample of Agriculture is an area frame for sampling characteristics associated with farms constructed at Iowa State University with the USDA and the Bureau of the Census cooperating. This frame consists of county maps upon which minor civil divisions and county units containing a specified number of segments have been delineated. The number of farms per segment was equalized at about 4 farms per segment. This was considered about the minimum number that would produce segments for which acceptable boundaries could be found on county maps.

nonirrigated land; grazing land was divided into privately owned land, land controlled by the Forest Service, and land in Indian reservations.

In 1955 and 1956 the enumerations were conducted on both open- and closed-segment bases. In the closed-segment approach, only the agricultural activities within the boundaries of the segment were enumerated; for the open segment, data pertaining to the entire operation of farms headquartered in the segment were collected. For field crops there was little difference in the levels of the estimates obtained by expanding the data from the open and closed segments. Sampling errors, however, were appreciably less for the closed segment—one-third to one-half those of the open segment. For livestock, there was an appreciable difference in the levels of the estimates obtained from the open and closed segments. Estimates from the closed segments tended to be 10 to 15 percent higher, but sampling errors tended to be roughly the same. Part of this difference in level was attributed to response errors; the closed segment was thought to be providing the better estimate.

As the result of these investigations, crop acreages have been enumerated since 1956 only on the closed-segment basis. Livestock items were enumerated on both open and closed segments for 2 more years, but in 1961 the open segment was also dropped for the livestock items. For characteristics which pertain to the farm as a whole or to its operator (such as the number of farms, type of farm, farm labor, and income) the unit enumerated must be the entire farm. The open segment is still used for data of this sort and the same segments are being enumerated on both bases. This procedure is working quite well with few operational problems.

Two fall surveys were originally contemplated, one as of October 1 and the other centered around December 1. Because it soon became evident that the October survey was not essential to the overall program, it was abandoned after 1957. The December 1 survey is conducted as a subsample of tracts enumerated during the preceding June survey.

For the June 1961 enumerative survey, the size of the sample allocated to 16 States was increased to an average of about 450 segments per State with each segment containing about two farms.

These States were Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, and Texas. The allocation to States and within States was made with a view to providing estimates with a degree of precision and reliability necessary to provide serviceable estimates at the State level; it also took into account the precision of the estimates for the region. The segments were constructed by splitting the area comprising two contiguous Master Sample segments into four parts. In making these splits the attempt was made to equalize cropland, number of farmsteads, and total land. This provided a cluster of four contiguous segments which could be rotated as required in future surveys.

Sampling errors from the June 1961 survey turned out to be slightly higher than anticipated. In Georgia, Oklahoma, and Texas the sample picked up certain problem segments whose contribution to estimates of variance was such that there was a marked disparity between these and variance estimates from pilot surveys. Coefficients of variation of State estimates were generally around 5 percent for farm numbers and around 6 to 8 percent for acreages of major crops; they ranged much higher on minor crops. For regional estimates, coefficients of variation were much lower, around 3 percent for major crops and livestock numbers.

In 1962, the size of the sample in four more States—Wisconsin, Minnesota, Missouri, and Nebraska—was increased from pilot to operating level, making a total of 20 States at the operating level. For the 20-State region, the sample consisted of a total of 8,580 segments containing about 17,000 farms. The results from the survey were about as expected: coefficients of variation for the 20-State region for estimates of farm and livestock numbers and of the generally grown crops tended to be roughly 10 percent smaller than those for the 16-State region in 1961.

The coefficients of variation obtained demonstrate the efficiency of a sample survey as a means of collecting agricultural data. The precision of the regional estimates is adequate for most purposes and when the survey is extended to all States, very precise national estimates should result. But for State estimates the precision needs

to be increased, especially for the less important items. Probability mail surveys which complement the enumerative surveys are being viewed as a likely solution.

Current Program of Enumerative Surveys

As developed during the exploratory phase, the current operational program of enumerative surveys is based on an area frame. For each segment in the sample, a cluster of four segments was constructed as described in the previous section. For a particular survey, one segment of each cluster is enumerated as an element of the sample; the other three are used for segment rotation in subsequent surveys. The sample design recognizes the necessity for State as well as regional and national estimates. Each State is treated as a separate stratum so that an appropriate sample size can be allocated, and each State is further stratified by grouping counties which have similar farming activities. These strata, in most instances, are identical to crop reporting districts. The allocation of segments to crop reporting districts is based largely on the square root of the value of products sold, but due consideration is given to the acreages of important crops and the numbers of the different kinds of livestock.

The estimators being used are the direct expansion, ratio to identical segments for the preceding year (current/current), ratio to land, ratio to an undetermined base (which can be different for each item), a difference estimate, and an estimate based on a censored distribution. The censored distribution is used for State estimates. It consists of truncating segment totals for those characteristics which are extremely large and which occur relatively infrequently. The technique involves the replacement of the reported values above a predetermined cutoff point by a value which is an approximation of the expected value for the portion of the distribution above the cutoff point. This substitute value is arrived at in one of two ways: either by averaging values above the cutoff point over a period of several years, or by averaging over time the ratios of the means of the two portions of the distribution.

The fall survey centered on December 1 is conducted as a subsample to the June or spring survey. About one-sixth of the tracts enumerated in

June are selected as the sample for December. (A tract is land inside a segment under the control of one operator.) Estimators used are the direct expansion ratio to June, and the difference estimate.

Development of Objective Yields

The Statistical Reporting Service has been forecasting and estimating yields per acre for many years. The yield (and production) of a number of nationally important crops is forecast at monthly intervals, often beginning 2 months or longer before harvest. These forecasts are based generally on grower appraisals of crop condition and expected yield, and persistent bias is removed by charting. These forecasts have been quite satisfactory over the years. Occasionally, however, in seasons when changes are unusually large, the changes may not be fully reflected in the subjective appraisals.

As part of the program for improving crop and livestock estimating methods, exploratory work was initiated to develop procedures for basing forecasts and estimates on objective counts and measurements. In keeping with the benchmark data provided by the enumerative surveys, objective estimates of yield of comparable precision were contemplated, and forecasting techniques based on objective counts and measurements were sought which would be independent of judgment appraisals.

For corn and cotton, exploration of sampling techniques and development of yield forecasting models based on plant relations were begun in 1954. Similar work on wheat and soybeans was started in 1955, and on sorghum, 3 years later. It was apparent that when the crop is mature and ready for harvest that estimating yield is largely a sampling problem, and that crop-cutting techniques based on a well-designed sample of suitable sized plots could produce estimates of yield with the desired precision. Forecasting yield before the crop is mature and even before the fruit has been set by the plant was recognized as being more difficult. The necessity for breaking yield into components that are predictable was clearly evident, so study of the factors of plant numbers, fruit numbers, and fruit development in conjunction with plant maturity was begun.

Current Program of Objective Yields

For objective yield surveys, a subsample is selected of fields picked up in the June enumerative survey. The fields in the subsample are selected with probabilities proportional to size, and then two plots each of equal size are located by a random process (with equal probabilities). As indicated in the section on subsampling, this procedure makes the sample of plots self-weighting.

Tentative models for forecasting cotton and corn yield from counts and measurements have been developed. An operational program of objective yields for these two crops was begun in 1961 along with the spring and fall enumerative surveys. These models were moderately successful for the August 1 and October 1 forecasts, but it was necessary to make allowances for crop maturity in the September 1 forecasting procedure. As survey data are analyzed and more precise plant relations are discovered, refinements are added.

Cotton model. Two sample plots, each two rows wide and 10 feet long, are laid out in each sample cotton field. This is done by the enumerator at the first visit about August 1. Subsequent visits are made about September 1, October 1, and after harvest. For very late fields, a fourth visit prior to harvest is made about November 1. Data collected are: width of row space; number of plants; numbers of squares, small bolls, large bolls, and burrs; and the disappearance of tagged fruit.

Two forecasting models for cotton have been developed. Both of these are based on the fruiting pattern of the cotton plant. Several earlier studies of the fruiting behavior of cotton were useful as a basis for deriving these models. One such study was made in the early 20's, another in the late 30's and early 40's in connection with the crop-weather project, and a third in connection with cotton grown in the western States under irrigation. All three of these studies contain detailed information on the fruiting pattern of the cotton plant in the form of a history of individual bolls traced throughout a growing season. The use of these data in the construction of forecasting models required a logical translation of data collected at very frequent intervals into yield surveys conducted at intervals of one month.

The development of constants or parameters which would apply to the observed data and the forecast date is also required.

The fruiting pattern of the cotton plant is essential as a basis for predicting fruit to come. When the plant is 3 to 4 weeks old, it begins to set fruit. The fruit first appears as a bud or square which develops into a bloom in approximately 3 weeks. After 4 or 5 days, the bloom becomes a small boll. Then at about 2½ weeks, the small boll attains its maximum size. Therefore, about 6 weeks are required for a square to develop into a full-sized boll. In another 2 or 3 weeks the boll matures and opens so that the cotton may be picked.

The rate-of-fruiting forecasting model is based on the fruiting pattern developed from the early studies. A fruit-load curve, which expressed the observed number of fruit on the plant as a percent of the maximum fruit load which the plant has at any time during the season, was plotted relative to the length of time since squaring began. This relation takes the form of an S-shaped curve. The linear approximation of this curve is actually used in the model. The maturity of the plant in terms of the pattern of fruiting is determined by classifying the plants in the sample plots in each field into one of four categories, depending on the kinds of fruit observed. In Category I are placed sample plots in which 20 or more large bolls are found. The reason for requiring a minimum of 20 bolls is that with this number, about half the plants in the plot (average about 35) will have 1 or more large bolls. Large bolls appear about 6 weeks after squaring begins, so that this appearance coincides with maximum fruit load. Sample plots in which blooms or small bolls are found but which contain less than 20 large bolls are placed in Category II. The point in the growth curve at which blooming begins is about 3 weeks after squares start to set, and this point becomes the other boundary of the category. In Category III are placed those plots which contain squares but no blooms or bolls. Category IV consists of plots containing no fruit at all.

After the sample plots have been classified according to maturity, the next step is to translate the maturity categories into percentages of maximum fruit load. This is done by assuming

that for a large number of samples the plots in a given category will tend to be distributed uniformly over the interval and that the midpoint of this interval will represent satisfactorily the fraction of maximum load for the plots in the category. Thus, for the entire sample, those fields classified in Category I are presumed to have their entire maximum fruit load, Categories II and III, 75 percent and 25 percent, respectively, and Category IV, zero.

In order to find the percentage of maximum fruit load for the average of the entire sample of plots, the fraction of the number of fields in each maturity category is used as a weighting factor to weight together the percentages of maximum fruit load for each maturity category. The forecast of maximum fruit load is obtained by dividing the average number of fruit per plot by the weighted average of percentage of maximum fruit load.

The next step is to calculate the weekly rate of fruiting. Since the maximum fruit load is 100 percent or 1 and the number of weeks from squaring is 6, it is evident that the weekly rate of fruiting, represented by the linear approximation to the sigmoid curve, is one-sixth. The rate before the fruiting starts and after maximum fruit load is obtained is taken to be zero.

The weekly rate of fruiting for all sample plots as of the time of the survey is computed rather simply. Since Categories I and IV are not producing additional fruit, the fraction of plots that are in maturity Categories II and III is multiplied by one-sixth. There is a good relation between rate of fruiting and additional bolls to be added so that the weekly rate of fruiting has proved to be a good predictor of additional bolls that are to be added by the plants. This relation may be rationalized by reasoning that the greater the rate of fruiting the larger the number of bolls that are likely to be set. The predicted number of mature bolls at harvest is the sum of the number present when the survey was conducted and the number expected to be added by the plants.

The second forecasting model is called the rate-of-survival model. This model is based on the fact that blooms and bolls which appear on the plant during the early stages of its fruiting period have a much greater chance of surviving to produce mature cotton than those which are

set after the plant is carrying a larger portion of its ultimate load of fruit.

The survival rates require a sensitive measure of plant maturity. The one which is currently being used is the ratio of large bolls to total bolls. Data obtained by noting the disappearance of tagged blooms and bolls were averaged over several seasons, and the observed survival rates for the different kinds of fruit were found to be closely related to the maturity index. From these relations the fraction of fruit on the plants that can be expected to survive may be predicted. One more element is needed in the model to allow for the production of bolls from late fields in which fruiting has not yet begun. For this purpose, a relation was worked out by averaging, over several seasons, the number of large bolls to develop from fruit not set with respect to maturity ratio. To use the rate of survival model, it is necessary to: compute the maturity ratio; multiply the average number of fruit observed in each of Categories I, II, and III by its expected survival rate; determine the bolls expected from plots in which fruit has not yet begun to form; and sum these four parts to obtain the forecast of bolls at harvest.

Corn model. A sampling unit used for plant observations within fields consists of two adjacent 15-foot row sections. Two of these units are selected in each sample field. Field observations are made each month in each field for randomly selected units which are permanently marked on the first visit. Each sample field is visited during the week prior to the August 1, September 1, and October 1 forecast dates and post harvest. Data collected during these visits include row width measurements, plant counts, ear counts, ear measurements, stage of maturity, and weight of mature ears.

Objective forecasting formulas have been developed which will translate observed plant characteristics on a given date into a forecast of yield at harvesttime. The forecasting model developed for corn gives an estimate of yield within the sample units which is then expanded to a yield per acre estimate based on the area within the sampling units. This estimate is then adjusted for normal harvesting loss in order to estimate actual harvested production. Postharvest surveys in sample fields have shown for most States

the average harvesting loss is about 8 to 10 percent. Basically, the forecasting model consists of two parts which are used to forecast the two principal components of yield: (1) number of ears that will be produced and (2) weight of grain to be produced per ear.

For an August 1 forecast, the estimating problems are more complex in that for many fields the crop is so immature that plant characteristics which can be translated into good estimates are not measurable. For example, ears will not be present on many young plants, or, if ears are present, they will not have attained their maximum size. This is particularly true in the North.

For the August 1 forecast, two different relations are currently being used for forecasting the number of ears with grain that will be present at harvesttime. The first approach is to use the relation between the number of stalks in the measured plots and the number of ears which will be produced. This relation is: $Y_1 = a + bX$. In this equation X is the average number of stalks per sampling unit, a and b are parameters estimated from previous samples, and Y_1 is the estimated number of ears which will produce grain. The second approach assumes a fixed linear relation between the fraction of stalks with ears on August 1 and the ratio of ears already present to the number of mature ears that will be produced. The following equations are employed:

$$fY_2 = a + bX \text{ and } Y_2 = \frac{\text{No. of ears present Aug. 1}}{fY_2}$$

In these equations X is the fraction of stalks with ears, a and b are parameters estimated from previous surveys, fY_2 is the estimated ratio of ears present August 1 to mature ears at harvesttime, and Y_2 is estimated number of ears which will produce grain. Experience has shown both of these methods give estimates which have about the same precision so that currently for August 1 the number of ears expected to be present at harvesttime is based on the average of Y_1 and Y_2 .

Numerous studies have shown that corn ears attain their maximum size by the time they are in the milk stage of maturity. This fact and the relation between length of ear and weight of grain produced per ear make it possible to predict the weight of grain expected per ear for fields which are in the milk stage or later but still are not mature. The relation between ear length and

the weight of grain produced per ear is: $Y_1 = a_1 + b_1X$. In this equation X is the total length of cob, measured over the husk, and Y_1 is the weight of grain produced in pounds, adjusted to 15.5 percent moisture content. Again a and b are parameters estimated from previous samples.

In those States where very few fields are in the milk or later stages of maturity on August 1, there is no relation between observable plant characteristics and final ear weight. Consequently, the historic average weight per ear is used for these fields in order to compute the estimate of yield per acre.

By September 1, most of the ears that will produce grain are mature enough to be identified and counted. The average number of ears expected to be present at harvest is estimated by the average number of ears counted for September 1. For the few sample fields which have not reached the milk stage of maturity the number of ears expected to produce grain is estimated using the August 1 forecast procedures. The weight of grain that will be produced per ear can be estimated from the average length of cob as measured on September 1. It has been shown that a similar though not quite as precise a relation exists between the average length of kernel row and the weight of grain produced per ear. For the September 1 forecast, the model uses both of these relations to forecast ear weight. Two indications of ear weight are computed and then combined to obtain the forecast of weight per ear. When fields are fully mature, the sample ears are harvested and weighed. Randomly selected ears are subjected to laboratory analysis in order to estimate moisture content and shelling percent which can be applied to the field weight of the harvested ears to compute the average weight of grain per ear adjusted to 15.5 percent moisture content.

By October 1 practically all fields in the South and many of the fields in the North will be mature and the sampling units can be harvested. For fields which are still immature on October 1, yield can be forecast using the same procedure as used for September 1.

Two other problems exist for those samples which are harvested before full maturity is reached or in those areas where a killing frost may occur before the crop reaches full maturity.

When sample ears are harvested too soon, it is necessary to adjust the weight per ear as computed from the field weight and the data from the laboratory analysis to adjust for dry matter which would have been laid down had the ears been allowed to mature in the field. Studies have shown that dry matter is being laid down until moisture content of the grain is below 30 percent. Based on this relation, procedures have been developed which allow this adjustment to be made for those samples harvested before the moisture content is below 30 percent.

The other problem occurs where growth in late fields may be stopped by a killing frost. By using the August 1 stage of maturity to estimate the number of days required for the sample field to reach maturity and comparing this with the average number of days from August 1 to the first frost, it is possible to adjust the forecasted weight for each of the preharvest surveys.

This concludes the discussion of the methodol-

ogy now being employed by the Statistical Reporting Service in its program of agricultural data collection. Forecasting models for wheat, soybeans, and sorghum are being developed, but are not yet ready for operations. Because the procedures for forecasting the yield of these crops are being changed as better relations are discovered, these procedures in their present developmental state are not treated here. In this chapter, the more important estimating procedures used by SRS have been outlined. This nontechnical description of the procedures generally used by the organization in producing its estimates is provided as background to the more detailed treatment of specific applications and of adaptations and specialized methods developed to handle the different conditions encountered. The chapters which follow are devoted to estimating procedures for the different commodities and details of the methodology employed.

CHAPTER 3. FIELD AND SEED CROPS*

Field and seed crop statistics deal with all the major crops except fruits, vegetables, and nuts; the crops covered involve approximately 80 percent of the total crop acreage in the United States (table 1). Crops covered include not only field and seed crops but also maple sirup, naval stores, and meat meal and tankage.

The pattern of statistics for field crops is rather uniform. For most of them the general coverage includes (1) acreage planted, (2) acreage harvested, (3) yield per acre harvested, and (4) total production. Harvested acreage and production estimates for most field crops, particularly the major ones, go back to 1866. Estimates of planted acreage for many crops were begun in 1919 and for others in 1929; before 1919 estimates related, for the most part, to acreage of a crop actually harvested; acreage lost from any cause was excluded.

Although field crop statistics do not go beyond the stage where a crop loses its original identity, rather detailed information is provided on crops after they are harvested. Disposition data for feed grains generally include quantities used for feed and seed on farms where produced, and sales. Disposition data for food grains include quantities (1) sold, (2) fed on farms where produced, and (3) used as homegrown seed.

It is the policy of the Service to add or drop estimates as conditions warrant. For example, buckwheat estimates were once published for 12 States in which buckwheat was an important crop; today the crop has dwindled to the point where estimates are published for only 4 States.

The general methods employed in estimating acreage and yield of field crops are based largely on the theory of sampling—selecting a limited number in the universe whose behavior is used to describe the behavior of the whole. The sampling procedures embrace both mail and enumerative survey methods. The aim is to maintain as much objectivity as possible in sample data. It would be desirable to place all surveys on a

random sampling basis so that measures of reliability may be mathematically calculated. For the most part, however, samples consist of farmers who report voluntarily on operations for the farm they operate and in some instances also for their neighborhood. For some commodities, survey data actually represent close to total acreages.

For many major crops, additional data on quantities are obtained at certain points in the sequence of marketing and manufacturing. Data obtained at these check points are used to determine the accuracy of individual crop forecasts, to revise preliminary estimates where necessary, or to true up a historical series to make it a more reliable base for forecasting a current crop. Most crops that must be processed are checked in this way. Among them are: cotton (bales ginned), tobacco (warehouse receipts), sugar beets and sugarcane (factory receipts), and naval stores, including turpentine and rosin (processing plant output). Less of this kind of checking is done for feed grains than for other field crops.

The many varied inquiries that go to farmers are tailored to provide the specific information needed for estimating purposes. Locality data provided by the volunteer reporters are largely subjective; that is, reporters must exercise considerable judgment in arriving at the figures they report.

Since 1954 a supplementary estimating method based on probability sampling has been used. Basically it consists of: (1) enumerating randomly selected land areas for acreage data; and (2) making crop population and fruiting counts on randomly selected sample units to obtain information on seasonal advancement, fruiting rate, and outturn per acre.

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TABLE 1.—*Statistical Coverage of Field and Seed Crops*

Crop	Acreage			Production	Production, by classes, by types	Stocks	Disposition	Monthly marketings	Prices received by farmers	Value of production	Value of sales
	Intentions	Planted	Harvested								
Field crops:											
Barley.....	X	X	X	X		X	X	X	X	X	X
Beans, dry edible.....	X	X	X	X	X		X	X	X	X	X
Broomcorn.....		X	X	X			X		X	X	X
Buckwheat.....		X	X	X			X	X	X	X	X
Corn, all purposes.....	X	X	X								
Corn for grain.....			X	X		X	X	X	X	X	X
Corn for silage.....			X	X					X		
Corn for hogging, grazing, or forage.....			X								
Cotton lint.....	X	X	X	X				X	X	X	X
Cottonseed.....			X	X			X		X	X	X
Cowpeas grown alone.....	X	X	X								
Cowpeas interplanted.....		X	X								
Cowpeas, equivalent solid acres.....		X	X								
Cowpeas for peas.....			X	X			X	X	X	X	X
Cowpeas grazed or plowed under.....			X								
Flaxseed.....	X	X	X	X		X	X	X	X	X	X
Hay, all.....	X		X	X		X	X	X	X	X	X
Hay, wild.....			X	X					X		
Hay, alfalfa and mixtures.....			X	X					X		
Hay, clover, timothy, and mixtures.....			X	X					X		
Hay, lespedeza.....			X	X					X		
Hay, soybean.....			X	X					X		
Hay, cowpea.....			X	X					X		
Hay, peanut.....			X	X					X		
Hay, grain.....			X	X					X		
Hay, other.....			X	X					X		
Mung beans.....		X	X	X					X	X	X
Oats.....	X	X	X	X		X	X	X	X	X	X
Peanuts grown alone.....	X	X	X								
Peanuts interplanted.....		X	X								
Peanuts, equivalent solid acres.....		X	X								
Peanuts picked and threshed.....		X	X	X		X	X	X	X	X	X
Peas, dry field.....	X	X	X	X	X		X	X	X	X	X
Popcorn.....		X	X	X			X		X	X	X
Rice, rough.....	X	X	X	X		X	X	X	X	X	X
Rye.....	X	X	X	X		X	X	X	X	X	X
Sirup, maple.....				X			X		X	X	X
Sorghums, all purposes.....	X	X	X								
Sorghums for grain.....			X	X		X	X	X	X	X	X
Sorghums for silage.....			X	X					X		
Sorghums for forage.....			X	X					X	X	
Soybeans grown alone.....	X	X	X								
Soybeans interplanted.....		X	X								
Soybeans, equivalent solid acres.....		X	X								
Soybeans for beans.....			X	X		X	X	X	X	X	X
Soybeans grazed or plowed under.....			X								
Sugarcane for sugar and seed.....			X	X					X	X	X
Sugarcane for sirup.....			X	X			X		X	X	X

TABLE 1.—*Statistical Coverage of Field and Seed Crops—Continued*

Crop	Acreage			Production	Production, by classes, by types	Stocks	Disposition	Monthly marketings	Prices received by farmers	Value of production	Value of sales
	Intentions	Planted	Harvested								
Field crops—Continued											
Sugarcane sugar and molasses				X							
Sugar beets for sugar	X	X	X	X					X	X	X
Sugar beet sugar, pulp, and molasses				X							
Tobacco, by States	X	X	X	X					X	X	X
Tobacco, by types	X	X	X	X	X				X	X	
Velvetbeans, all purposes		X	X	X			X		X	X	
Wheat, winter	X	X	X	X					X	X	
Wheat, durum	X	X	X	X		X			X	X	
Wheat, other spring	X	X	X	X					X	X	
Wheat, all	X	X	X	X	X	X	X	X	X	X	X
Seed crops:											
Alfalfa			X	X		X	X	X	X	X	X
Alsike clover			X	X		X	X	X	X	X	X
Crimson clover			X	X		X			X	X	
Red clover			X	X		X	X	X	X	X	X
Sweetclover			X	X		X	X	X	X	X	X
White clover			X	X		X			X	X	
Ladino clover			X	X		X			X	X	
Smooth Bromegrass			X	X		X			X	X	
Crested Wheatgrass			X	X		X			X	X	
Merion Bluegrass			X	X		X			X	X	
Kentucky Bluegrass				X		X			X	X	
Fescue, Chewings			X	X		X			X	X	
Fescue, Red			X	X		X			X	X	
Fescue, Tall			X	X		X			X	X	
Orchardgrass			X	X		X			X	X	
Redtop			X	X		X			X	X	
Ryegrass			X	X		X			X	X	
Bentgrass			X	X		X			X	X	
Sudangrass			X	X		X			X	X	
Timothy			X	X		X	X	X	X	X	X
Lespedeza			X	X	X	X	X	X	X	X	X
Mustard			X	X	X				X	X	
Vetches (3)			X	X	X	X			X	X	
Austrian winter peas			X	X		X			X	X	
Lupine			X	X		X			X	X	
Seed potatoes, certified			X	X	X						
Vegetable seeds			X	X	X	X					

Estimates represent the combined efforts of both field and Washington personnel. For the most part the initial work starts in the field offices. Sample data are collected, summarized, analyzed, and interpreted into recommendations for each crop by the field statistician and then sent to the Washington office. In Washington the

data are again reviewed in detail by the Crop Reporting Board, with each member making his own interpretation of the data. These interpretations are then resolved into the official estimate.

Estimates of acreage that farmers intend to plant are issued first. They are followed by estimates of acreage planted and, later in the season,

by acreage harvested. Estimates of prospective crop production are made during the growing season. At the end of the year final or preliminary postharvest estimates are made.

For most crops, production estimates are merely the product of estimated yield per acre and acreage harvested. Both acreage and yield per acre are estimated independently from sample data for each category. The tool used for estimating acreage and yield is the regression chart, on which current survey indications are plotted on the X axis and read off the Y (independent) axis. In other words, an indication reported currently is compared with final revised estimated data from previous years.

In the discussion of field crop statistics that follows, overall information is given first on acreage, yield and production, stocks, and disposition and value. Policy, procedures, and data for estimating in these broad areas are common to most of the crops in the group. Next the chapter treats separately crops or small groups of crops for which special procedures are used.

ACREAGE

Acreage estimates and forecasts serve several fundamental purposes. Most important, for nearly all field and vegetable crops, acreage estimates are one of the two components of forecasts and preliminary estimates of production (yield per acre is the other component). Preliminary production estimates made during the growing season are the product of independently made estimates of acreage and of yield per acre. Similarly, final production estimates are the product of final estimates of acreage and yield, except for a few cash crops for which nearly complete processing or marketing data are available.

In addition, acreage estimates become a fundamental part of the Department's programs; they provide basic data for research, program planning, and administration. Forecasts and estimates of acreage help farmers plan their plantings, serve as direct measures of land utilization, and are primary indicators of the future demand for various farm production supplies and farm labor.

In general, the progression of acreage forecasts and estimates is from prospective plantings to actual plantings, acreage for harvest, and actual

harvested acreage. Most spring-sown crops follow the sequence of: (1) acreage intended for planting (prospective plantings) as of March 1, released about mid-March, (2) acreages planted and acreage for harvest, released with the July Crop Production report, and (3) acreage planted and harvested, released in the December Annual Crop Production Summary. However, all spring-sown crops do not follow this exact sequence. For example popcorn acreages planted and for harvest are estimated in August rather than in July and several minor commodities are estimated annually only in the December Annual Crop Production Summary. Fall-sown grains (winter wheat and rye) depart from the sequence, as seeded acreage is estimated in December of the year preceding harvest and acreage of winter wheat for harvest is estimated in May.

Acreages based on the major acreage surveys in March and June are adjusted, if necessary, for use in computing monthly production forecasts, but these adjusted acreages are usually not published. Such adjustments are necessitated by unusual conditions (usually weather) that result in changes in growers' plans relative to the acreage to be planted or harvested. Such adjustments are based primarily on the current condition or probable yield of the crop as reported by the monthly farm reporters. In some instances, special acreage data are made available either through special surveys or acreage evaluation items on the monthly Farm Report.

The primary purpose of the report on prospective plantings issued in March is to assist growers generally in making such further changes in their acreage plans as may appear desirable. The acreages actually planted may turn out to be larger or smaller than indicated, by reason of weather conditions, agricultural programs, price changes, labor supply, financial conditions, and the effect of the report on farmers' actions. The report on prospective plantings is released sufficiently early that modification of plans is possible in most areas. The prospective acreages are used as a base to which projected yields for spring wheat on June 1 are applied, to give a production forecast before the July harvested acreage estimates are available.

Planted acreage is usually larger than the harvested acreage because of crop failure or uses for

which estimates are not made. For example, acreage used for pasture, cover crop, and soil improvement is not considered as part of the harvested acreage for most crops. The total harvested acreage of many crops is broken down into utilization groups. For example, although the major use of corn and sorghums is for grain, separate estimates are also made for the acreage harvested for silage and for forage, including acreage grazed or hogged. The breakdown of soybean acreage is for beans, hay, and other uses; cowpea and peanut acreages are treated in the same way. The estimate of the acreage of each small grain (wheat, oats, barley, rye) harvested for grain excludes acreage harvested ripe and fed unthreshed as well as the acreage harvested for hay or cut green for silage or green feed. The aggregate acreage of all small grains cut for hay, including acreage cut ripe and fed unthreshed, is estimated as a single item and is published as one of the kinds of hay.

Methods

In general, acreage estimates are based on two types of information: (1) absolute acreage data for a given crop season, ordinarily obtained from the quinquennial United States Census of Agriculture, a State assessors' census, or some other complete or nearly complete enumeration; and (2) indicated changes in acreages of individual crops from one year to the next, obtained by questionnaire (either mail or personal enumeration) from samples of farmers or processors. Acreage data of the first type are called acreage bases or benchmarks, while the sample data are called acreage indications.

The United States Census of Agriculture, taken each 10 years from 1850 to 1920 and each 5 years since, provides data on harvested acreage for most of the principal crops. These data are not always comparable from one census to another from State to State or among the crops, but in general they provide benchmarks for reviewing longtime changes in the principal crops grown in this country. Generalizations that evaluate census data are difficult because of differences among States and differences between censuses in timing, definitions, and questions asked. But it is safe to say that for most crops Federal census totals represent minimum levels.

The annual State assessors' census is another valuable benchmark in 13 States. This varies in completeness from State to State; in some States it is not complete enough to serve as an absolute benchmark. Data from the State assessors' census are available in time for either preliminary acreage estimates each December or for the revisions the following year. The Federal census data, however, do not become available until a year or more after the year to which they relate. Accordingly, Federal census data are used for benchmarks in future years and for "truing up" historical estimates. The changes made after each quinquennial census are shown as census revisions, since the bulk of the new evidence comes from the census, but other relevant data are also considered or reconsidered at the same time.

An almost ideal method of obtaining accurate acreage information would be to make a complete enumeration by mail, by personal interview, or by a combination of both. This would provide a means of obtaining data on both planted acreage and harvested acreage by method of utilization. This ideal is hardly approached even in the States where the assessors' censuses ask for acreages in the current rather than the preceding year, for ordinarily only one type of acreage information, either planted or harvested, is available. Furthermore, insufficient time elapses between the harvesting of late crops and the date of the yearend acreage and production estimates in December to make possible the use of current data even if the assessors' censuses were taken in the late fall after harvest.

Sources of Sample Data

The sample data are secured from two main types of surveys—mailed and enumerative. The mailed surveys are divided into two groups—one for crops that are widely grown (Appendix A, exhibits 1-5) and the other for those crops grown in specialized localities which would not be adequately represented in a general-purpose sample (Appendix A, exhibits 6 and 7). The enumerative method is used only for the June acreage and the fall acreage surveys (Appendix A, exhibits 8 and 9). For the general surveys of field crop acreages—March prospective plantings, June acreage, or the fall acreage—questionnaires are designed to obtain data on crops widely grown

within a State. The questions for individual crops relate to the individual operations of the growers who answer the questions—being limited to the farm or ranch operated for the mailed survey and to the sample segment for the enumerative survey.

In most States, the March prospective planting and the June acreage questionnaires are mailed to large lists of general farmers, and the fall acreage survey questionnaires are distributed in October by rural mail carriers. A predetermined number of cards is allotted to each rural carrier for distribution to representative farmers on his route. Presumably this distribution is more nearly random than the distribution of questionnaires mailed to farmers on lists maintained in the State offices. In a few States, fall cards are also mailed direct to each reporter who sent in a card the previous year, in order to provide a large number of "identical" returns.

The March survey questionnaire (Appendix A, exhibit 1) regarding prospective plantings (mailed late in February) obtains data on the acreages of specific spring-planted crops planned for the current year (or actually planted in the far South) and the acreage planted the previous year. Information on fall-planted crops is also reported and provides a basis for preliminary estimates of acreage of these crops for harvest. The June questionnaire (Appendix A, exhibit 2) also asks both this year's and last year's acreages, while most of the fall acreage survey questionnaires have spaces for reporting only the current year's harvested acreages. The fall questionnaires (Appendix A, exhibit 3) used in areas where abandonment is frequently heavy, ask for both planted and harvested acreages of the various crops.

Special surveys are necessary to obtain acreage information on crops that are not widely grown or are grown only in localized areas. These special surveys (Appendix A, exhibits 6 and 7) usually ask for acreage as well as for other information on the crop; they may vary materially from State to State for the same crop. They usually ask for acreage data on the individual farm and sometimes "judgment" questions covering the acreage in the locality as a percentage of the previous year.

Basic data for the preparation of estimates of utilization of acreage of a given crop are usually obtained by means of the acreage utilization and abandonment survey questionnaires (Appendix A, exhibits 4 and 5). These are usually mailed in August for small grains in Central and Southern States and in early November for small grains in Northern States and for fall-harvested crops. These questionnaires, mailed to individual farmers, ask for information concerning utilization of planted acreages of various crops and the production obtained on the acreage harvested for each specific purpose. A few States use a combined fall acreage survey and fall acreage utilization and abandonment survey to obtain measures of the acreages planted or harvested and of the utilization of such acreages; questionnaires are distributed through a combination of rural-carrier and direct-mail methods.

Summarization

Sample data obtained from the enumerative survey are totaled for each crop within the sample segment, and segment totals are combined for crop reporting districts. The totals for crop reporting districts are expanded to obtain State indications by using: (1) the reciprocal of the sampling rate, (2) the ratio of individual crop acreage to total land in segments, and (3) the percentage change indicated by segments identical with segments of the previous year.

Sample acreage data obtained from the mail surveys are totaled for each crop along with the reported land in farms or cropland, or both. Data are summarized by crop reporting districts or by some other predetermined stratification. The derived indications for the several strata are weighted together to arrive at weighted State indications and include: (1) Ratio of individual crop acreage to land in farms; (2) ratio of individual crop acreage to cropland or land in crops (in some States); (3) current/historic percentage relation, where acreages of a crop for both this year and last year are reported on the same card; (4) current/current, or "identical," percentage relation which is obtained by matching the current year's card with the card sent in by the same reporter for the same farm the previous year; and (5) harvested/planted percentages in States where both are reported.

The "ratio to land" indication is the percentage that the aggregate reported acreage of each crop is of the reported total land in farms; it is computed separately for each district. The district ratios for the individual crops are weighted by total land in farms. Weighted State average "ratios to land" provide reliable indications for crops grown on a large percentage of all farms. In some States, particularly western semiarid States, where the reported land in farms tends to fluctuate from year to year, the ratio to cropland is computed to give a more stable indication. This is computed crop by crop, and the district ratios are weighted by total acres of cropland.

The current/historic relation is expressed as a percentage of the previous year and is derived solely from the current year's survey. Computation of the current/current relation is somewhat more involved, as it is necessary to match entries for each crop on the current year's card with those on the card sent in by the same reporter for the same farm the previous year. This necessitates arranging cards for the 2 years in a way that allows them to be readily matched. The relation is expressed as a percentage of the previous year. The current/historic or current/current percentage change indicated for each district is weighted by the acreage of the particular crop in the district in the previous year to obtain the State indication.

An indication of the total acreage of all crops is obtained by computing the ratio of total crop acres reported to total acres in farms. This indication is weighted by total land in farms and is plotted as the independent variable on a chart with total acres of crops as estimated by the Crop Reporting Board as the dependent variable. This weighted indication serves as a sort of balance item to keep the total of all acreage estimates in line. After tentative estimates have been set for individual crops, it provides a clue to whether the total for all crops is reasonable, or high, or low. After the tentative estimates for the individual crops have been reviewed, adjustments are frequently made which more nearly satisfy all indications.

The expansions from the enumerative surveys represent unbiased totals that require a minimum of further analysis for purposes of providing acreage indications other than a review of sam-

pling errors. There is some selectivity in the response to each of the three mailed acreage surveys, and the field statisticians make sure that the surveys are handled comparably from year to year. Selectivity in the sample data does not invalidate their usefulness so long as the bias from this source is relatively constant from year to year. Large growers of specialized crops are not included, because data from such farms would distort the relations among the crops.

The summarized data from the mailed surveys are translated into estimates by means of regression charts. The final estimates of the Crop Reporting Board are plotted on regular Cartesian chart paper against the survey indications. The survey ratio and percentage indications are plotted on the X axis on the charts with the appropriate Board acreage or percentage change on the Y axis. (See discussion in chapter 2.)

The current/historic and identical indications are generally the most reliable evidence of change obtained from special surveys for crops that are not widely grown. Estimates based on ratios to land or ratios to crops from special surveys would not be valid because the correlation between farm size and acres of special crops is usually very low. It is obvious that, with a shifting base, expanding operations would not necessarily give increasing ratios and might even show inverse relations.

The acreage utilization data obtained from the acreage utilization and abandonment survey are summarized in about the same way as data from the three large mailed acreage surveys. Acreages for each type of utilization and the acreage abandoned are converted to percentages of the reported acreage planted.

These percentages are then interpreted by means of charts showing the regression of the Board estimated percentages for previous years on reported percentages; in census years census percentages are used as benchmarks. The chart readings, along with the indications from the enumerative survey, are converted to State and National estimates of acreage utilized for each purpose. The sum of the acreages by type of utilization equals the total estimated acreage of the specified crop, either planted or harvested; the kind of total acreage used depends on the categories of utilization included. A more detailed

description of acreage utilization estimates is given later in this chapter.

Check Data and Revisions

For certain specialized crops, other data sources are used in addition to special survey data from farmers. Much information is obtained from factories that contract for acreages of certain crops for processing. Sugar beet factories, for instance, provide data on both planted and harvested acreage. As these data are complete, they are considered more reliable than quinquennial U. S. census data obtained from growers. Irrigation companies that supply water to growers of rice and other irrigated crops are valuable sources of information regarding acreage. Complete reports of railroad and truck in-shippments of seed potatoes provide some evidence of acreage of this crop in States which do not produce their own seed. For certain crops, evidence for estimating crop acreages is obtained from administrative records of other branches of the Federal Government. The Agricultural Stabilization and Conservation Service (ASCS), the production-control agency of the Department, makes allotments of acreages to growers; these allotments provide useful indications of acreages of several crops. Actual field measurements from the same source also provide indications of the same crops.

Acreage revisions are made and published annually for those crops for which there is complete or nearly complete check data on acreage and production. Revisions for cotton, tobacco, peanuts, and sugar beets are scheduled as soon as feasible after marketings of the crops. Revisions for tobacco and sugar crops are published in the May and June Crop Production reports and for peanuts in the April Crop Production report. A special release is published in May each year showing revisions for cotton. Acreage revision procedures are somewhat more involved than those for the earlier estimates. The same regression charts used in making earlier estimates are reviewed. In addition, charted indications from postharvest surveys are used. Acreage measurements by ASCS, reports by irrigation companies, factory and processing reports, and all other relevant material are considered. Estimates of acreage that reconcile all the evidence are tentatively adopted concurrently with esti-

mates of yield. These estimates are then further adjusted if necessary so as to provide the production totals that are indicated by the production check data. A more complete description of revisions may be found in the discussion of yield and production.

Necessary revisions for all other field crops are published regularly in the December Annual Crop Production Summary. Some States have additional evidence for most crops from State assessors' reports. In other States less conclusive evidence may be available from shipment data, stocks, or other sources for a review or revision of estimates for certain crops.

In all States the estimates for the previous year for each crop are reviewed on the charts in December for indirect evidence whether or not acreage and production check data are available. It has been found that if an appreciable error was made in setting an acreage the previous year, the indications for the current year will be divergent. The indications relating to percent change will produce a current estimate of acreage at variance with the acreage indicated from the ratio charts. If an adjustment is indicated by the evidence, the previous year's acreage is revised, thus giving a more reliable base for the current year's estimate. Conversely, if the current year's indications are consistent, the indirect evidence confirms the evidence for the previous year.

YIELD AND PRODUCTION

The Statistical Reporting Service is responsible for making (1) forecasts of crop production from current crop conditions during the growing season and (2) annual estimates of crop production. These are two separate and distinct functions. The term "estimate" refers to a measure of accomplished fact, such as of a crop at harvesttime or later; the word "forecast" refers to expectations of what is likely to be accomplished at some time in the future. The word "yield" refers to yield per acre.

The first forecast of production of winter wheat is published, by States, about December 20, of the year previous to harvest, largely on the basis of reported condition as of December 1 and precipitation August through November. Monthly forecasts of production are made beginning in April for winter wheat, June for spring wheat, July

for most other spring- and fall-sown field crops, and as late as August for cotton, popcorn, peanuts, sorghums, soybeans, and broomcorn.

It should be clearly understood that a *forecast is a statement of the most likely magnitude of yield or production, on the basis of known facts on a given date, assuming weather conditions and damage from insects or other pests during the remainder of the growing season to be about the same as the average of previous years when reported condition on the given date was similar to the present reported condition.* The yield potentialities of the current condition may be appraised accurately, but if weather or other conditions between the date of the forecast and the time of harvest are not similar to those experienced in past seasons that have been used in the determination, the actual yield may differ somewhat from the forecast. As the season progresses the forecasts made at or just before the harvest merge into estimates of accomplished fact.

Methods Used To Forecast Yield and Production

One of the original statistical activities of the Department, starting with its founding in the 1860's, was the reporting of condition of crops during the growing season.

About 1880 the concept of normal condition was initiated, with 100 used to designate normal condition, which is generally defined as follows:

A normal condition is not an average condition, but a condition above average, giving promise of more than an average crop. Furthermore, a normal condition does not indicate a perfect crop, or a crop that is or promises to be the very largest in quantity and the very best in quality that the region reported upon may be considered capable of producing. The normal indicates something less than this, and this comes between the average and the possible maximum. The normal may be described as a condition of perfect healthfulness, unimpaired by drought, hail, insects, or other injurious agency, and with such growth and development as may be reasonably looked for under these favorable conditions.

The conception of what constitutes a "normal" condition of a crop obviously varies from one

locality to another with differences in soil and climate. It also changes slowly, over time, in the same locality because of changes in varieties, cultural practices, and soil fertility. Shifts in the acreage distribution of a crop within a State, from areas of low yields to areas of high yields, may mean that the same reported condition will indicate a higher yield than it once did, while a shift in the opposite direction may have the reverse effect. The relative constancy of the aggregate of all the individual reporters' ideas of normal condition has greatly enhanced its usefulness.

As early as the 1880's some dealers in farm products began to interpret the reported condition of each major crop in terms of actual bushels, tons, or pounds of probable yield. The desirability of having such interpretations made by the Crop Reporting Board, and therefore available to all, rather than by private individuals and available to a few, was pointed out by the Keep Commission in 1906. In 1912 the Crop Reporting Board began to publish forecasts of yields.

The method used originally was the so-called "par" method, which assumes a proportional relation between reported condition and final yield over the entire range of reported condition values. Letting C' represent currently reported condition, \bar{C} the 10-year average condition on this date, \bar{Y} the 10-year average yield, and Y' the most probable yield for the current season, the formula

used was $Y' = C' \frac{\bar{Y}}{\bar{C}}$. This formula is based on

the simple proportion $C' : Y' :: \bar{C} : \bar{Y}$. The value of the assumed 100 percent yield, $\frac{\bar{Y}}{\bar{C}}$, was

calculated and published for each month, for each State, at the beginning of the season, so at crop-report time only the currently reported condition C' had to be substituted in the formula before working out the value for Y' . The inflexibility of the par method necessitated subjective modification of the condition index or the pars, to eliminate the disturbing effect of highly atypical years and of gradual trends in the data. The marked superiority of the graphic regression method of translating reported condition into a forecast of yield led to its adoption and to the

abandonment, in 1930, of the par method of forecasting field and vegetable crop yields.

The introduction of hybrid seed and high yielding strains and other improved cultural practices have materially increased yields since World War II. Because the upward trend is not fully explained by reported condition, time is used as a separate variable in multiple regression charts. The usual estimating procedure is to compute the net regression of yield on condition, taking time into account. Deviations from this line are then plotted against time. A chart reading of condition would be the regression value from the current level of condition plus an increment for time. (See discussion in chapter 2.)

The Crop Reporting Board does not forecast yield solely on the basis of reported condition. As a crop nears maturity, crop reporters are asked to estimate the probable average yield in their localities, and the averages of these crop reporters' forecasts are translated into yield forecasts by the Crop Reporting Board by means of regression charts in which "true" yields are plotted against reported probable yields. For most crops, reported yields take into account weather conditions, cultural practices, and other factors; consequently no adjustment for trend is necessary.

Forecasts and end-of-year estimates of yield per acre for major crops in many States in selected months are based also on objective yield survey indications. In the objective yield survey, trained enumerators visit selected fields chosen in line with probability theory to get counts and measurements of crop growth characteristics on small plots. This is done during the growing season for indications of probable final yield. At harvesttime actual yields are measured, and after harvest the harvesting losses or gleanings are measured. From these sample results, probable and final yields are derived with a computable degree of probability and are available to the Crop Reporting Board when making yield estimates. The objective yield survey programs and methods are discussed in detail in chapter 2.

Possibilities of using weather data to forecast and estimate crop yields have been investigated. Results to date have shown that the effects of weather factors are so complex that, in the United States, weather data alone do not provide a

practical basis for estimating prospective crop yields per acre. But such data have been useful in adjusting crop reporters' appraisals of prospective yields. It has been discovered, for example, that some crop reporters tend to overestimate prospective yields when rainfall is excessive at the time the reports are made and to underestimate prospective yields when rainfall is below normal.

The problem is to find a measure of the effectiveness of rainfall that is not properly reflected in the reported condition of a crop. Rainfall data have proved useful in connection with estimating the winter wheat crop, especially in areas where precipitation is very influential in determining the final yield. The best results have been obtained when the total rainfall, or some index involving rainfall, during certain months has been used in conjunction with the reported condition or probable yield to reflect some measure of the ability of the crop either to respond to additional moisture or to withstand deficient rainfall. In this connection, standard procedure in some States is to use an index computed by multiplying the reported condition of winter wheat as of December 1 by the inches of fall precipitation (August through November in most States) in forecasting yield per acre. For States in which the winter wheat crop matures early, the July-March precipitation is multiplied by reported condition on April 1 to compute the index used on April 1. These computed indexes are charted against the Board estimates of yield per planted acre to show the relation in past years. While this method is still used currently as one indication in forecasting winter wheat production, it has largely been superseded by using condition, or probable yield per acre, rainfall during specific months, and time as separate variables in the multiple regression equation.

$$Y_c = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

in which

Y_c = computed yield per acre

X_1 = condition (or reported probable yield per acre)

X_2 = precipitation for specified months prior to the date of forecast

X_3 = precipitation for specified months after date of forecast

X_4 = time

The number of months for which precipitation data are included in the X_2 and X_3 variables depends on the month for which the forecast is made and weather-yield relations for the State in question. In areas where subsoil moisture is usually a major factor in determining yield, the X_2 variable would include precipitation for the preceding 8 to 10 months or more. As an example, the variables used in the multiple regression equation in estimating wheat yield in Montana on May 1 are as follows:

X_1 =May 1 condition

X_2 =precipitation July preceding year through April current year

X_3 =precipitation May and June

X_4 =time

In using this equation, the X_3 variable, precipitation after the forecast date, has to be estimated. Such an estimate is generally based on the weather patterns to date, taking into account such factors as the 30-day Weather Bureau forecast. The relation between the yield per acre computed (Y_c) from the multiple regression equation as of May 1 and Board final yield in Montana is shown in figure 8.

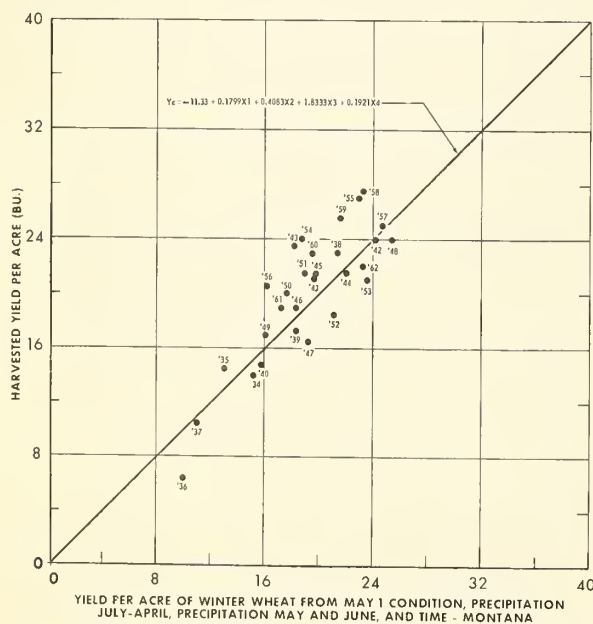


FIGURE 8.—Graphic relation between computed yield per acre (Y_c) as of May 1 from multiple regression: X_1 , May 1 reported condition; X_2 , precipitation July-April; X_3 , precipitation May and June and X_4 time, and Board final yield per acre harvested of winter wheat in Montana.

It is difficult to devise purely objective measurements of the effectiveness of rainfall, but pasture condition has sometimes been found useful. Ordinarily in wet seasons pasture condition is reported relatively higher than crop condition; in dry weather, pastures suffer sooner and to a greater extent than crops, so reported pasture condition is relatively lower than crop condition. This makes it possible to use pasture condition as an aid in evaluating reported crop condition. (See figs. 18 and 19.) Even though reports of pasture condition itself are biased, that very bias may be used to help compensate for bias from the same cause in reported crop condition.

Estimating Production

The most reliable estimates of crop production are made directly in terms of total bushels, tons, or bales when data covering production are available. The number of bales of cotton ginned, pounds of tobacco sold, and tons of sugar beets harvested for sugar are direct measures of the production of those crops. Similarly, the quantity of rice milled, peanuts processed, and receipts of flaxseed at elevators furnish excellent check data on production although they do not include all of the production of these crops. The residuals, which include such items as seed, home consumption, and feed for livestock and poultry on farms where grown, are estimated from sample data reported on individual farm disposition schedules. Unfortunately, direct check data on production are seldom available at the time the annual estimates of production are first required. For preliminary production estimates of most field and vegetable crops, therefore, the usual practice is to estimate acreage and yield per acre, and then compute production.

Estimating Yield Per Acre

Estimates of yield per acre are based on past relations between yields obtained from the quinquennial census of agriculture or other nearly complete enumerations, on the one hand, and currently reported sample yields on the other. Current sample yields on a locality basis are taken from the regular monthly crop report questionnaires, and the current individual farm yields are derived from an "acreage and production" survey which is usually made in early November.

The acreage and production mail survey is designed to obtain, as nearly as possible, the type of data collected by the Bureau of the Census. But whatever the design of the questionnaire, data drawn from the voluntary mail samples used by the Department contain biases because of selectivity in the lists and in the response. They cannot ordinarily be accepted without some adjustment. The method used is that of graphic regression described in chapter 2. The dependent variable is the actual or true yield per acre each year, represented on the chart for past years by final estimated yields, which in quinquennial census years are essentially yields reported by the Census. The independent variable is a current indication, such as reported average yield per acre of winter wheat in Nebraska taken from the August Farm Report or derived average yield per acre of wheat in Nebraska taken from the acreage and production survey. For example, a chart similar to that shown in figure 9 is used in August to estimate the average yield per acre of winter wheat in Nebraska. These charts are brought up to date each year.

The indications from reporters relate to the crop reporter's judgment of average yields in his locality; the acreage and production indications are for his own farm. The two sets of indications

are considered when arriving at the yearend estimate of yield published in December.

Revisions

When all the check data for the production of a crop such as cotton, tobacco, sugar beets, rice, peanuts, or flaxseed become available some months after completion of harvest, the official estimates of production are revised, if necessary, to bring them into reasonable relation with the check data. Although approximate production may be ascertained by check data, the final estimate is the product of acreage multiplied by yield per acre, except for cotton, sugar beets, and sugar cane for sugar and seed. For these three crops, acreage and production estimates are adopted and the yield per acre derived. Annual revisions are scheduled in advance and are released at the same time every year—peanuts in April, cotton and tobacco in May, the sugar crops in June, and broomcorn in August.

For such feed crops as corn, oats, and hay—in fact, for the majority of field and vegetable crops—production check data are incomplete and therefore are not ordinarily used as a basis for revising preliminary production estimates. For such crops the major indications of yield or production, which are independent of the voluntary crop reporters' indications, are obtained from (1) the quinquennial census of agriculture or (2) the annual State farm censuses in the States in which production questions are included on the census questionnaire. In States that lack production data from an assessors' census, there is often no fully satisfactory independent indication of yield or production except in Federal census years. Therefore there is little basis for revision of preliminary production estimates for these crops until the next quinquennial census confirms the level of the estimates or suggests a change.

STOCKS

Regular periodic reports on stocks of grains and oilseeds, both on farm and in commercial storage off farms, are an increasingly important phase of crop reporting. The Statistical Reporting Service surveys farm stocks and stocks in all off-farm storages not covered by other agencies. In 1963, storages covered by other agencies were limited to Commodity Credit Corporation

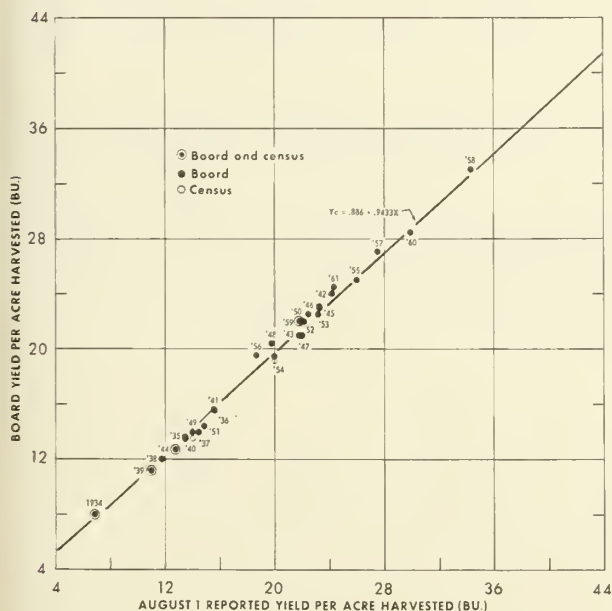


FIGURE 9.—Graphic regression chart used in estimating winter wheat yield per acre as of August 1 in Nebraska.

(CCC) bin sites and "mothball" ships and stocks of soybeans located at soybean processing plants. The Crop Reporting Board combines data on stocks obtained by the Statistical Reporting Service with data from other agencies into quarterly reports covering stocks of corn, wheat, oats, barley, rye, soybeans, flaxseed, and sorghum grains as of January 1, April 1, July 1, and October 1. Stocks of rice are published for the quarterly periods of January 1, April 1, and October 1, and for the end of the marketing season date of August 1. Hay stocks are limited to farm stocks as of January 1 and May 1. Peanut stocks and naval stores are published monthly with procedures given in later sections of this chapter.

Estimates of stocks of wheat and corn on farms March 1 were begun in 1883, and estimates of oats and barley were added later. Between 1895 and 1909, a series of estimates was instituted covering farm stocks of corn, wheat, oats, barley, and hay at the end of each marketing season. Beginning in 1926, these were superseded by the current quarterly series of farm stocks of corn, wheat, and oats. Barley, rye, soybeans, sorghum grain, and flaxseed were added later.

Reporting of grains in off-farm positions started with wheat stocks in mills and elevators on July 1, 1919, and coverage has increased to include most grains in all off-farm storages. This expanded coverage involved integrating some enumerations made by other agencies with data collected by the Statistical Reporting Service. Stocks of wheat at merchant mills (flour mills) were obtained by the Bureau of the Census as were oilseed stocks at processing plants. Similarly, commercial stocks of grains at terminal elevators in as many as 46 cities were reported by another agency of the Department.

The problems of coordinating data from several agencies were of such magnitude that the responsibility for coverage of all storage positions was shifted to the Statistical Reporting Service, except for soybean stocks at processing plants and CCC-owned stocks in bin sites and "mothball" ships. Responsibility for coverage of wheat stocks at merchant mills was assumed by the Statistical Reporting Service in July 1945 and for terminal elevators in October 1960. The merchant mills were discontinued as a separate

category in October 1957 and combined with interior mills, elevators, and warehouses. The terminal category was discontinued in October 1960, and the storage facilities previously identified as terminals were combined with interior mills, elevators, and warehouses.

Farm Stocks

The basic data for estimates of most farm stocks are obtained on the Farm Report (Appendix A, exhibit 10) from monthly crop reporters as of the quarterly dates. Reporters are asked paired questions, one asking for production of each commodity, the other for quantity on hand as of the date of the questionnaire. These reported stocks on hand are converted to percentages of production, then expanded into quantitative estimates, by States, by applying an adopted percentage to estimated production. The adopted percentage is arrived at by plotting the reported percentage on a time-series chart. The percentage for each quarter constitutes a separate line which shows relations by quarters for each year, as well as a relation of the current quarter with the same quarter for previous years (fig. 10). The difference between the percentage from one quarter to the next is disappearance in terms of percentages. This procedure has the advantage of showing several years, and unusual differences from quarter to quarter and from year to year are easily seen, as are also departures from usual trends.

Another type of chart used in estimating stocks shows the quarterly percentages for each crop year as a separate line which more or less parallels lines for previous years. The line for each year may be differentiated by color or plotting symbol. Another method of analysis consists of converting the adopted percentages to actual bushels and plotting the quantities on a time-series chart.

In most instances, the percentage stocks derived from sample data are adopted, but if an unusual situation is apparent, further study is made of reported data by crop reporting districts. This may result in the adoption of one or more district percentages in line with other districts or the same district in other years to adjust faulty or inadequate reported data. During periods of significant farm loans and farm resale ac-

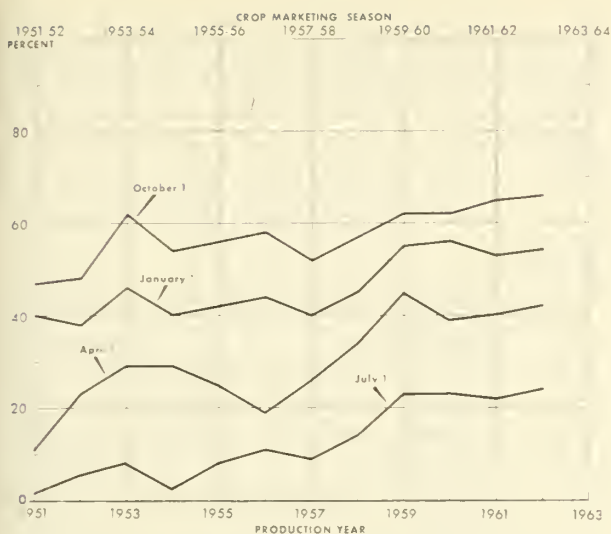


FIGURE 10.—All wheat, Nebraska, stocks on farms as percentage of production by quarters, 1951-62.

tivity, such data are secured from the appropriate agency in the Department and used as a check against the sample data. This may indicate the need to depart from the sample data. Such tests as are applicable have indicated that the biases inherent in this type of sample have not materially affected the representativeness of the sample.

In January 1948, data relating to farm stocks, along with other data, were obtained by mail from a systematically drawn sample of farms which had been visited by interviewers in April 1947. When data reported in January 1948 were expanded by methods used for the interview survey they corroborated estimates prepared in the usual way. In April 1948, various follow-up samples by mail and mail surveys of totally independent lists of farms in certain States gave results that substantiated current Board estimates. These studies were undertaken because of the absence of benchmarks to set the level of estimates of farm stocks.

Off-Farm Stocks

Stocks of grain in commercial off-farm storages are obtained on a sample basis by special questionnaire (Appendix A, exhibit 11). Basic to the sampling and expansion processes was a complete enumeration of capacity in all off-farm storage plants in each State as of February 1, 1942 and April 1, 1943. The latter date marks the be-

ginning of estimates in off-farm positions for commodities other than wheat. Constant efforts are required to keep the lists and capacity data current. Initially lists were divided into several groups of related plants, such as merchant mills, oilseed processors, terminals, elevators, and warehouses, and other storages. In some States the miscellaneous "other storages" group was further broken down into feed mills, breweries, distilleries, bean plants, and the like to facilitate the process of expanding reported data to an estimate.

It was often possible to obtain complete coverage of one or more of these groups, limiting the capacity to which expansion methods must be applied. However, the rapid changes that occurred during the 1950's in the grain merchandizing trade necessitated the consolidation of some of the groups. This consolidation has not reduced the effectiveness of the survey procedures, since the portion of the total capacity included in the sample has continued to increase. At the present time about 85 percent of the total known capacity is included. To obtain the estimates of stocks in all off-farm storages in the State, the estimates for each group are totaled.

Expansion processes used currently involve separate tabulations and summarization of the reports for each group of plants in the State. As the number and aggregate capacity of all the plants in each group are available, the expansion process for each group is simply a mechanical computation. For most groups, three expansion computations are made: (1) from average stocks, (2) by a ratio-to-capacity calculation, and (3) by the regression method. The expansion from average stocks is the calculation of average stocks for the plants reporting expanded by the total number of plants in the group. Similarly, the expansion based on capacity shows the relation of reported capacity and total capacity to the reported stocks and total stocks; the formula is

$$\frac{\text{Reported capacity}}{\text{Total capacity}} = \frac{\text{Reported stocks}}{\text{Total stocks}}$$

in which the computed total stocks become an indication upon which the estimate is based. The regression method is a refinement of the expansion process based on capacity and is believed to

eliminate much of the error that arises from the skewness of the sample.

An example of the effect of regression techniques on the expansion of sample data to an estimate is shown in the following computations for South Dakota. There were 497 plants in the State (excluding a group of 21 large plants that were completely enumerated) on January 1, 1963, with a total rated storage capacity of 70,093,000 bushels; these plants were sent questionnaires on January 1 that asked for stocks of wheat as well as of other grain in storage. In returns from 345 plants with a total capacity of 47,328,000 bushels, 17,387,000 bushels of wheat was reported on hand.

In this case, there is no question about having a representative mailing list because every known plant in the State is on the list. But it is evident that the large plants are underrepresented in the 345 that returned the questionnaire; the average capacity of these 345 plants is 137,183 bushels, whereas the average capacity of all 497 is 141,032 bushels. The average wheat stocks on hand per plant reporting is 50,397 bushels. Since the average capacity is smaller for the sample plants than for the State average, it is reasonable to suppose that the average stocks per plant is also too low. If it is assumed that the percentage discrepancy in average stocks per plant is equal to the percentage discrepancy in plant size, use could be made of the ratio to capacity estimate

$$\frac{70,093 \times 17,387}{47,328} = 25,750,000 \text{ bushels}$$

as the estimate of the total stocks held on January 1 by the 497 plants in the State.

This procedure provides a valid estimate only if the ratio of stocks on hand to plant capacity tends to be the same for all plants regardless of size. Although this appears to be a reasonable assumption when stocks are high and practically all plants are filled to near capacity, the situation may be entirely different when stocks are low. A more reasonable adjustment for the discrepancy between average size of plant, for the sample and for each State as a whole, can be obtained by using the regression of stocks on plant capacity. If the relation actually is nothing more than a simple proportional line, as assumed in the ratio estimate, the regression adjustment will automatically give the same result as the ratio estimate. On the other hand, if the line of relation

does not pass through the zero point on the chart and the use of the ratio is not warranted, the regression adjustment will make the proper correction for the discrepancy in average size of plant.

This adjustment is made by the equation

$$Y_s = \bar{Y}_s - b(\bar{X}_s - \bar{X})$$

in which

\bar{Y}_s = adjusted average stocks for plants in the sample

\bar{Y}_s = observed average stocks for plants in the sample

b = regression coefficient of stocks on plant capacity

\bar{X}_s = observed average capacity for plants in the sample

\bar{X} = average capacity of all plants in the State.

For the data at hand:

$$\bar{Y}_s = 50,397$$

$$\bar{X}_s = 137,181$$

$$\bar{X} = 141,032$$

The regression coefficient b is the only quantity whose numerical value is yet unknown. To minimize the arithmetic required, the approximate estimate of b is computed as follows. The sample plants are separated into two groups on the basis of size (capacity). The average capacity and stocks per plant are computed separately for each group of plants. The ratio of the differences of these averages is an estimate of b . For data at hand the results are:

Group	Number of plants	Average capacity	Average stocks
Large plants.....	153	226, 327	95, 441
Small plants.....	192	66, 146	14, 503
Differences.....		160, 181	80, 938

$$b = \frac{80,938}{160,181} = 0.50529$$

$$\begin{aligned} \bar{Y}_s &= 50,397 - (0.50529)(137,181 - 141,032) \\ &= 50,397 + 1,945 \\ &= 52,342. \end{aligned}$$

The estimate of stocks held by all 497 plants thus is (497) (52,342) = 26,014,000 bushels. This estimate is slightly larger than the ratio-to-capacity estimate of 25,750,000 bushels. Both this method

and the ratio-to-capacity method are based on the assumption that the relation of stocks to capacity for plants in each size group is the same for reporting and nonreporting plants. To the extent that this assumption may not be valid, neither method would completely adjust the sample data for selectivity in the returns.

Stocks of rice, both rough and milled, are obtained by a combination of mail and personal interview. Complete coverage of all known rice-handling facilities in the principal rice-producing States is obtained for each reporting date. Stocks of rice on farms are obtained from a sample of rice-producing farms and expanded to a State estimate, using the same procedure utilized for the other grains. Data published show farm holdings and stocks located at mills and at detached warehouses by ownership.

DISPOSITION AND VALUE

An annual report covering farm disposition and value of principal field crops is issued in early May of each year. This report contains preliminary estimates for the current marketing season of the quantities sold and to be sold, as well as amounts used or to be used as feed or seed on farms where grown. Revisions of the preliminary estimates for the previous marketing season are included in the May report. These revisions are based on end-of-season surveys and on such check data as reports of processors, market receipts, and records of handling or shipments. Original benchmarks for disposition estimates were obtained in the 1909 and 1919 agricultural censuses. More recently, the agricultural censuses of 1949, 1954, and 1959 provided data on sales of grain and hay. Disposition estimates are reviewed along with production estimates following each Census of Agriculture, and, where necessary, revisions based on the census indications and other data not available earlier are made.

Farm Disposition

In order to make the disposition estimates more meaningful, certain concepts regarding the estimates are set forth here: (1) Estimates of farm use and sales relate to disposition of a given year's production on farms producing the crop regardless of time of disposition. (2) Sales include all amounts sold whether to other farms or to

dealers. (3) Sales include any amounts of a commodity delivered to the Government for unredeemed loans and purchase agreements. (4) Estimates of quantities fed to livestock and poultry represent the portion of the year's crop production fed on farms where produced; thus, they do not represent total quantities of such crops ultimately used for livestock and poultry feeding. Grain and hay purchased for feed do not enter into these "fed" estimates. Some of the products shown as "sold" from farms are used for feed and seed in the same or other States. (5) For certain crops total seed requirements are shown; and for some, a further breakdown is made to show homegrown seed. The difference between total seed and homegrown seed represents purchased seed, which is included in the total quantity sold. (6) For soybeans, peanuts, and cowpeas, the total harvested production and quantities fed to livestock do not include the quantities "hogged off" on farms. (7) For the years before 1961, the utilization of corn for feed and seed was based on both equivalent production of all corn and on corn for grain. Because estimates of equivalent all-corn production were discontinued with the 1961 crop, all disposition items for that year and subsequent years relate only to production of corn for grain.

Quantities of principal feed crops sold are estimated, and the residual—production less sales—is shown as used for feed and seed. Disposition estimates for hay cover both quantity sold and quantity used on farms where produced. For food grains, and also soybeans, the quantities used on farms are estimated directly, and the residual becomes sales. Changes in marketing patterns, dietary habits, and other factors have reduced the quantity of grains used in farm households; estimates of this use were discontinued with the 1961 crop. In earlier years estimates of home use were made for corn, rice, wheat, rye, and buckwheat. For certain commodities of which there is practically no farm use, the entire production is shown as sales. Sales of some commodities are estimated directly from an analysis of survey data in which farmers report production and sales. For others, special disposition surveys are made in which farmers report their production of each commodity and the quantities used on their farms for each purpose. (See fig. 11.)

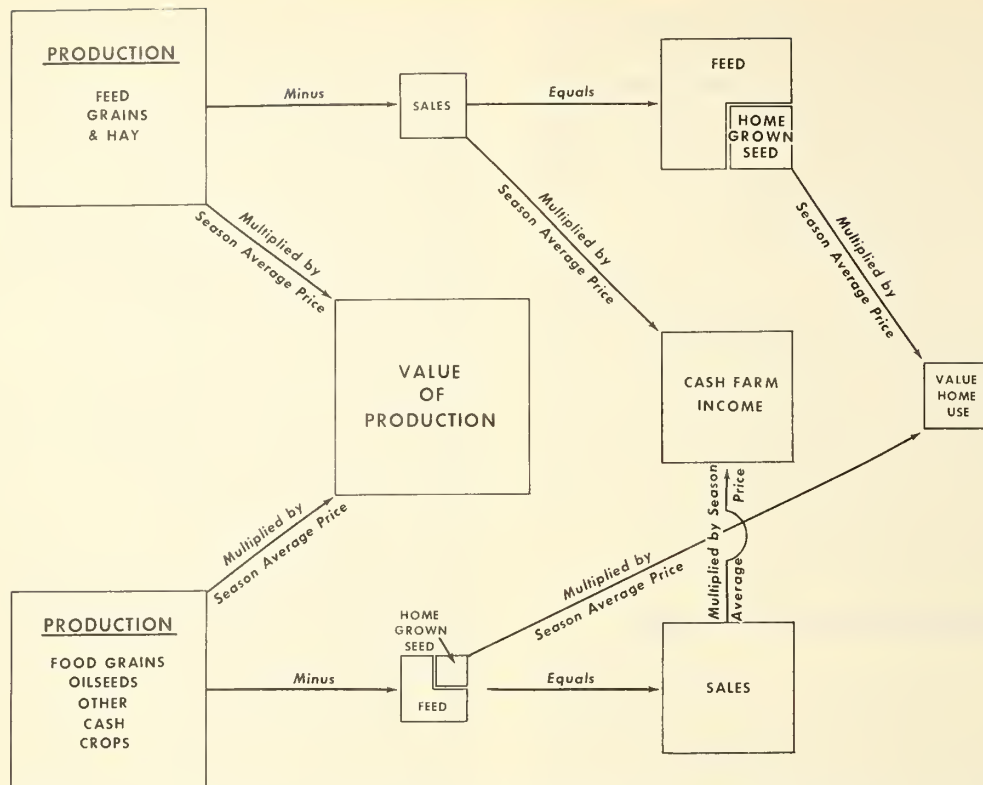


FIGURE 11.—The schematic chart depicts the two methods of estimating disposition of crop production and calculating values and cash farm income. Size of the figures is not proportional to the amounts.

Basic data for the preliminary sales estimates of feed grains and hay are obtained by the use of paired questions on the March 1 Farm Report, that ask for each commodity on the reporting farm, the amount produced, and the amount sold and to be sold. Quantities sold are converted to percentages of production. Regression charts are used to convert the survey percentage into estimates. One chart plots the indicated percent sold against the Board sales percentage. Some States, especially those where production is variable, prefer to convert the percentage indication to bushels before plotting against the Board quantities sold. Indicated quantities sold are also compared with changes in production or supplies by means of regression charts. In States with little Government-owned grain, sales show a high relation to supply (production plus carryover). Where the quantity of grain held under Government ownership or loan is large, the relation between supply and sales is upset, so charts relating the current year's production to sales are consid-

ered more reliable. In the process of setting the estimates, livestock numbers, prices, and supplies of other feeds are also given consideration as factors affecting the quantities sold.

Preliminary estimates of wheat and rye fed on farms where produced are based on indications from the February 1 Farm Report which has paired questions asking for production of the crop and the amount fed. The indicated percent of production is plotted against past estimates to arrive at the current year's estimate. For rice, buckwheat, and soybeans, the quantities fed are estimated by use of regression charts relating supply or production to the amount used for feed. Preliminary estimates of seed use are based on March 1 intended planted acres, the annual seeding rate, and the usual percent of homegrown seed. The estimates of the amount used for feed and homegrown seed are subtracted from production, and the amount remaining is considered as sold. Formerly an allowance was made for home use as food, but these estimates were discontinued

with the 1961 crop. The indicated sales are checked against such other information as receipts of rice at mills, which are obtained annually by State of origin. These, with other disposition data, also serve as a check against production estimates.

At the end of the marketing season, disposition surveys are made for several crops in order to obtain a more precise measurement of sales and other methods of disposition. Questionnaires are mailed to lists of farmers who grow each specific commodity. States participate in these surveys annually, biennially, or less frequently, the time interval depending on the stability of the disposition pattern and the importance of the State in production of the particular crop.

This end-of-season inquiry obtains basic data from individual farmers who report for their own farms on production, carryover stocks, and purchases—the items that make up total supply. Another set of questions asks for quantities used for seed, livestock and poultry feed, and food and for sales and the end-of-season or carryout stocks. Questions as to acreage planted and the quantities of seed used are used to establish seeding rate per acre. This rate per acre is used to obtain the quantity from the previous year's crop used for seed. The survey indications are used to determine proportion of total seed that is homegrown. Estimates of quantities used in the home for human consumption (now discontinued) and those used for feed are derived from quantities reported for these purposes. Quantity sold is total production less amounts used for feed, seed, and so on.

Monthly Sales

Information as to monthly sales of field crops is obtained chiefly from special surveys of monthly purchases by mills, elevators, and dealers who buy directly from farmers. Questionnaires are mailed to these grain handlers about July 1 for small grains and about October 1 for corn, sorghum grain, soybeans, and other late-harvested crops, asking for purchases of each commodity in each month of the marketing season just completed.

Reported monthly purchases are summarized and converted to percentages of total annual receipts. These percentages are evaluated by the

use of time charts maintained for each commodity showing Board percentages for several years; a different color or symbol is used for each year. If the currently reported monthly marketing percentages vary widely from the usual pattern, comparisons with such data as rail shipments, receipts at principal markets, and farm stocks as well as indications of an early or late harvest season are likely to suggest whether indications of monthly sales are representative.

Dealer information concerning receipts has been found more satisfactory in estimating monthly sales than the information from farmers on their sales. Reports covering large quantities of farm products are more easily obtained from the dealers. However, for hay and some other crops, monthly sales questions are asked on the questionnaire used to gather disposition information directly from farmers.

Value of Sales and Production

The value of sales for each crop is the estimated quantity sold multiplied by the season average price per unit of measure. Similarly, value of production and value of home consumption are calculated by applying the season average price received for the portion sold to total production and to the amount used on farms where grown. For most crops, the season average prices are the estimated midmonth prices weighted by the quantities sold in each month of the crop marketing season. For price-supported crops, an allowance is made for unredeemed loan and purchase agreement deliveries valued at the average loan rate, by States.

COTTON

Indications of cotton production can be divided into two categories: (1) Indexes of yield per acre, such as condition and locality yield per acre as reported by crop reporters and yield per acre derived from objective counts of squares, blooms, and bolls and of boll weights—all of which require an acreage component for expansion to a production level, and (2) indexes of production that are independent of acreage, such as the ratio to last year's production computed from data reported by crop reporters and ginnerers.

Appraising the two types of indications separately and bringing the respective levels into a composite indication of production is an impor-

tant phase of the estimating procedure. Before October, use of data from ginnerers is limited mostly to that from early harvesting areas because ginnings in other areas are not well underway. For the August and September reports, sample data on expected ginnings for the season are expanded by the ratio-to-last-year procedure.

As part of the analytical procedure, an appraisal of yield is made from: (1) condition, taking into account weevil damage; (2) locality yield; (3) objective yield indications; and (4) indicated yield computed from an equation in which condition, reported yield, and weevil damage are the independent variables. From the preponderance of evidence in this array a tentative yield estimate is adopted.

Next, a production indication is computed, using the tentative yield and the estimated acreage for harvest. This indication reflects the appraisal of prospective production that is based on indexes of yield per acre and acreage as currently estimated.

In addition, interpretations are made of the charts that show the expansions of expected ginnings reported by ginnerers and expected production reported by crop reporters; since these are in terms of total bales, they are independent of acreage.

A production estimate is then adopted taking into account the acres and yield approach and the expansions of expected ginnings and production. Published yields are derived from the acreage adopted in August and from production estimates.

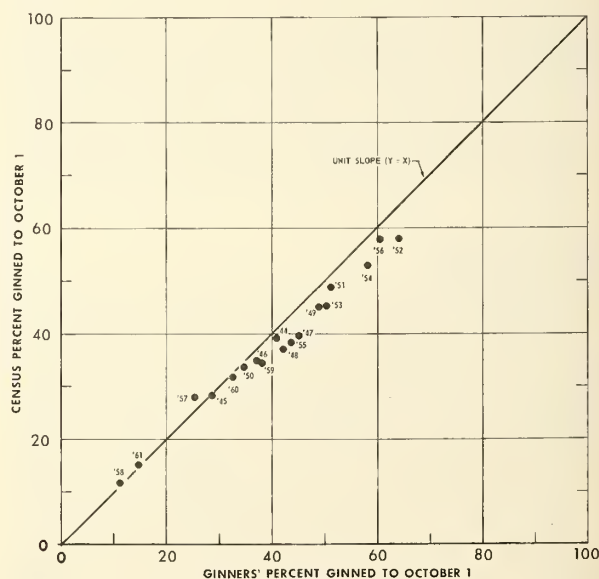
In years of allotments, preliminary reports on acreage measurements (from Government data on allotment compliance) are available for use in preparing the October and subsequent acreage estimates. Except for unusual conditions which may change abandonment, estimated acres for harvest remain rather stable. It is evident, therefore, that indications of production derived from estimates of yield per acre in October and subsequent months are not likely to be too high or low because of an appreciable over- or underestimate of harvested acres.

Usually, in most States, ginnings are sufficiently advanced by October 1 that ginnerers' reports at that time are of major importance in estimating the crop; their November 1 and December 1 re-

ports have significant value in all States. For the October, November, and December reports, considerable effort is directed to deriving maximum information on prospective production from data reported by nearly all ginnerers. The two procedures used are not statistically independent and are usually referred to as (1) "Board" percent ginned and (2) "ginnerers" percent ginned expansions.

An estimate of ginnings "to date" is common to both procedures. The first step for each of the two procedures is to expand the sample data on ginnings to date to an estimate for the State. This is done by a ratio expansion, using total ginnings to the first of the previous month or to the same date last year as the control. The percent ginned to date is then computed by districts and weighted to take care of any disproportional representation in the respective districts. These basic expansions are computed in State offices.

The key to the validity of the percent ginned procedures lies in the historical relation of the ginnerers' percent ginned, as computed, to the actual percent ginned derived from Bureau of the Census reports on ginnings to date and for the season. Figures 12 and 13 show the characteristic relation.



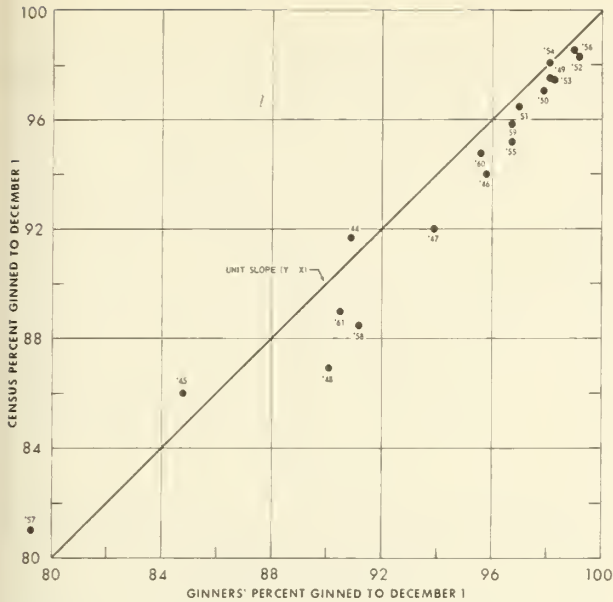


FIGURE 13.—Graphic regression chart used by Crop Reporting Board to estimate percent ginned to December 1 in Mississippi from percent ginned computed from reports on ginnings to date and additional bales expected to be ginned as reported by ginners.

For subsequent use in the estimating model, a "Board percent ginned" to date is adopted from a reading of these charts. A Board estimate for average bale weight is also made at this time, utilizing charts showing the relation between ginners' estimates of bale weight to date and the census final weight for the entire season. The remaining component of the percent ginned expansion is a correction for cross-State ginnings (cotton grown in one State and ginned in another). For this factor, cotton grown as a percent of cotton ginned in the State (as enumerated by the Bureau of the Census during the previous season) is used for the current year. Since the location of gins with respect to State lines is fairly stable from one year to the next, this factor is nearly a constant.

The components of the "Board percent ginned" expansion are as follows:

$$\frac{\text{Estimated bales ginned to date} \times \text{cross-State factor}}{\text{Board percent ginned to date} \times \text{Board weight per running bale}} \times 500$$

= Indicated production in 500-pound gross weight bales

It will be noted that the relation between ginners' estimates of percent ginned as computed for the October report and the actual percent ginned is generally proportional (fig. 12). In

other words, the actual percent ginned is equal to the ginners' percent ginned times a correction factor. In view of this fact, and partly as a check on the "Board percent ginned" estimate, an expanded estimate using the "ginners' percent ginned" and "ginners' reported bale weight" is computed as follows:

$$\frac{\text{Estimated bales ginned to date} \times \text{cross-State factor}}{\text{Ginners' percent ginned to date} \times \text{Ginners' weight per running bale}} \times 500$$

= Indicated production in 500-pound gross weight bales

The inherent bias removed in the Board percent ginned procedure remains a part of indicated production as computed from the ginners' percent ginned expansion. To remove this bias, the usual chart with indicated production on the horizontal axis and actual production on the vertical axis is used (see fig. 14). It will be noted that the actual production is above the line of unit slope by about the same percentage the ginners' percent ginned is below (see fig. 12). In one estimating procedure the bias is removed from the percent ginned and in the other at the production level. The latter procedure has some advantage when not more than 50 to 60 percent of the crop has been ginned.

The October forecast is based on a blending of the major considerations used for the August and

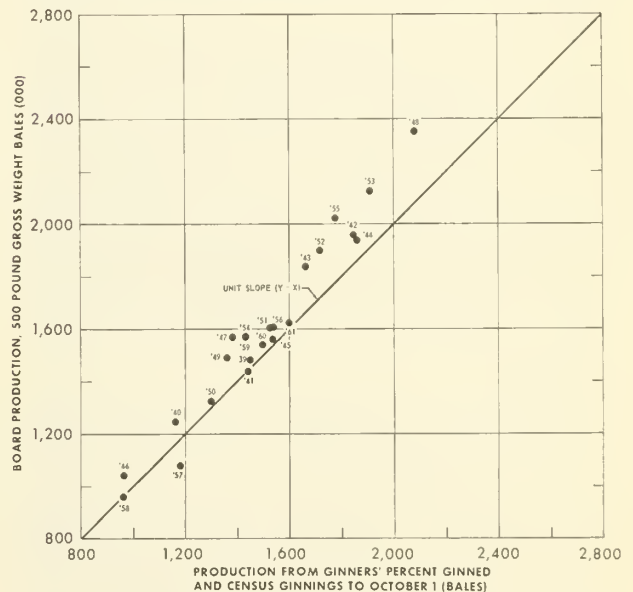


FIGURE 14.—Graphic regression chart showing the relation between the indicated production in bales for the "ginners' percent ginned" expansion for October 1 and production in 500-pound gross weight bales in Mississippi.

after freezing weather. By December 1 the number of bales ginned to date gives ginner an excellent basis for projecting their estimates of additional bales expected during the remainder of the season. As a result, the December production estimate is based almost entirely on the Board percent ginned procedure.

In May following the year of production all data for the season are reconsidered after the final cotton ginnings report is available from the Bureau of the Census. Revisions are then made in acreage, yield, and production, where necessary, on a State-by-State basis.

TOBACCO

The tobacco estimating program generally follows the basic pattern established for other major crops. However, because of certain characteristics of tobacco production and the abundance of timely check data, special procedures are frequently employed for collecting basic data, evaluating survey indications, and making forecasts and final estimates. Among the characteristics that make tobacco production unique are: specialized methods of culture; unusual plant-growth traits, and varying methods of marketing.

Estimates of acreage, yield, production, price per pound, and total value are on record by States on a yearly basis since 1866. For years since 1919 these estimates are broken down by types for each producing State. The crop is divided according to related types into six major classes—Flue-cured, Fire-cured, Air-cured, Cigar-filler, Cigar-binder, and Cigar-wrapper. A miscellaneous class includes Perique. Currently the tobacco estimating program encompasses 18 States and involves 38 separate State-by-type estimates. Except for a few minor State types, estimates of acreage, yield, and production by counties and of irrigation practices by crop reporting districts are prepared.

Since all major types of tobacco except Pennsylvania seedleaf and Cigar-wrapper are usually under Government program quotas, considerable data in the form of allotted acres, measured acres, and production are available to aid in the estimating program. For types not under quotas, State Statisticians have been able to secure reasonably complete data on acreage and production from producers and buyers. Complete sales data are available for practically every type at the end of the respective marketing seasons. By the

time the first series of revisions is published in May of the year following production, the estimates for most types are about in final form through the use of the various survey and check data. Principal exceptions are Maryland type 32 and Wisconsin types 54 and 55, marketings of which are still incomplete.

Among the most challenging aspects of the tobacco estimating procedure is the forecasting phase. The first forecast of production is made as of July 1 each year. Forecasts are reappraised each month through December. Generally, production forecasts are the product of estimated harvested acreage multiplied by a yield forecast. However, at about midseason for Flue-cured and late season for Burley and some cigar types, varying amounts of sales data become available which are considered in estimating production.

To arrive at yields during the forecasting phase, two basic indications are used—condition of the crop and probable yield per acre, both reported by crop correspondents. Each of these two indications is plotted on the X axis of chart paper and correlated with a historical series of Board final yields per acre, represented by the Y axis.

Because of certain inherent biases in the reported indications and oftentimes because of variations within these biases, further refinement is often necessary if the maximum benefit from these survey data is to be derived. For example, a sharp upward trend in the yield of most types of tobacco is in evidence, largely because of continued improvement in cultural practices. The condition of the crop as reported by correspondents, however, reflects practically none of this increase attributable to improved practices, often called the time trend.

A method has been devised whereby the effect of trend can be measured to a substantial degree. This method involves fitting a "net regression" line. The resulting deviations of yield from the net regression line are then plotted against a second variable, time. This procedure is demonstrated in figures 16 and 17.

Noteworthy is the apparent lack of correlation in figure 16 compared with the orderly behavior of points in figure 17. The value of considering time, or trend, when evaluating reported condition of tobacco is obvious. The slope of the least

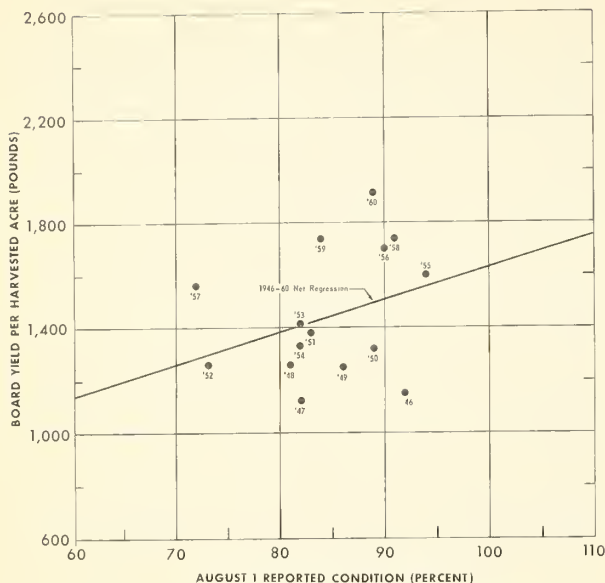


FIGURE 16.—Tobacco, North Carolina Type 13: Reported condition of tobacco as of August 1 correlated with Board historic yields per acre, typifying one of the regression series used in forecasting tobacco yields during the growing season. Through the data is plotted a net regression from which deviations are measured.

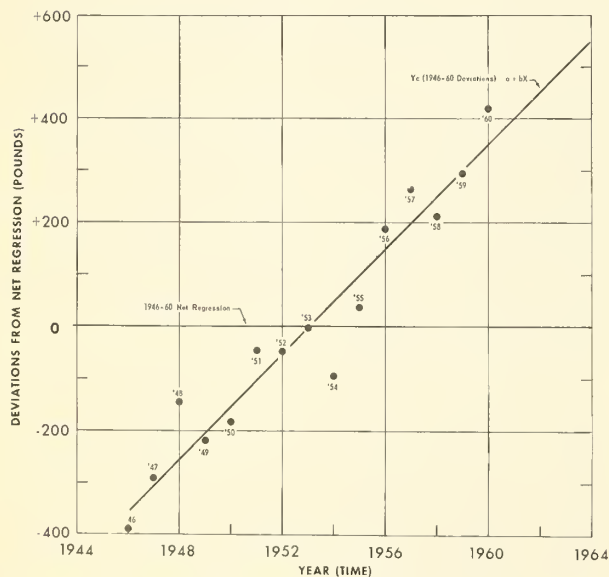


FIGURE 17.—Tobacco, North Carolina Type 13: As a means of further evaluating reported condition, deviations from the net regression on the chart in figure 16 are plotted against time. This process enables statisticians to determine to a considerable extent how much of the change in yields is associated with time.

squares line in figure 17 depicts the expected deviations with respect to the actual deviations from the net regression in figure 16 and also demonstrates the average yearly increase in yields that occurred independently of reported condition. In other words, if the reported condition had remained constant from a given year to the next, the expected yield would have increased approximately 50 pounds.

In forecasting tobacco yields, it has been apparent over the years that during the growing season producers tend to overstate the relative yield of the crop when soil moisture is abundant and to understate its relative potential when drought conditions prevail. There seems to be a natural cause for these judgments since the crop responds with luxuriant growth during moderately wet weather, giving the appearance of greater weight than actually exists. During periods of drought, however, the crop remains nearly dormant but afterwards has the inherent ability to recover and put on poundage rapidly.

In the analyzing of reported yield, in many instances pasture condition as a second factor has been found to help materially to adjust for the influence of moisture. Pasture condition is readily available and serves as an index of soil moisture. Thus, when deviations from reported yields vs. Board yields are charted against pasture condition, in effect a multiple regression is used with the various components displayed and evaluated graphically.

In instances where it is feasible to interpret reported yield per acre with the aid of pasture condition as a variable, the first step involves placing a least squares linear regression through the observations on the "Probable Yield vs. Board Yield" series. Yield deviations from this line are then plotted against pasture condition, which is weighted by the acres of tobacco of the type involved.

As illustrated in figure 18, wet-season yields are usually below the linear regression and dry-season yields are usually above, whereas yields during periods of nearly normal moisture tend to seek the middle ground.

Figure 19 demonstrates the behavior of the deviations from the linear regression when plotted against pasture condition. By inspection, it is apparent that the deviations in this case follow a

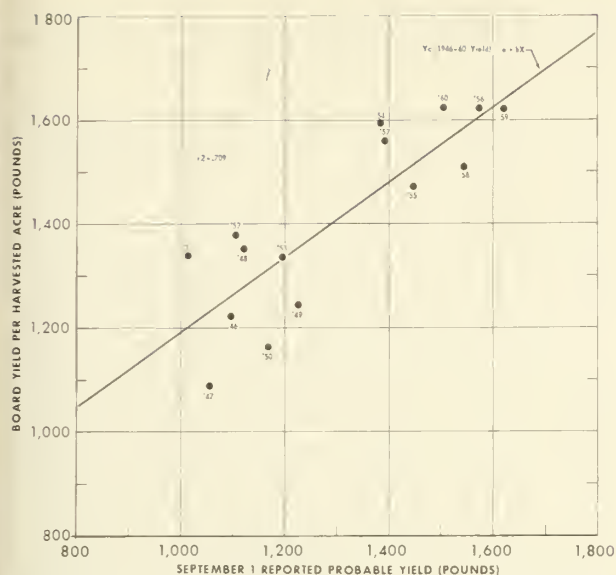


FIGURE 18.—Tobacco, Kentucky Type 31: Another important series of regressions used in forecasting tobacco yields is represented by the above chart which correlates probable yield per acre reported by correspondents with Board yields. A simple least squares regression has been computed from the observations and plotted.

curvilinear rather than a linear pattern, suggesting that distortion in reported yields becomes progressively higher as the incidence of moisture increases.

Normally in using charts such as shown in figure 19, a curvilinear regression through the deviations need not be plotted mathematically; however, for the purposes of demonstration and also for computing correlation, a second-degree curve was computed here.

With respect to correlation, the coefficient of determination (r^2) in figure 19, "Yield vs. Board Yield," equals .709, indicating that the line $Yc = a + bX$ has explained about 70.9 percent of the total variation of Board yields from the mean. In figure 20, r^2 equals .786 indicating that the line $Yc = a + bX + cX^2$ has further accounted for about 78.6 percent of the variation remaining unexplained in figure 19. Thus, between the two regressions, approximately 94 percent of the total variation has been explained; that is, $70.9 + 78.6 (100.0 - 70.9) = 93.8$.

To augment the regular survey indications, other sources of estimating data have been provided in recent years. Since 1954, some acreage

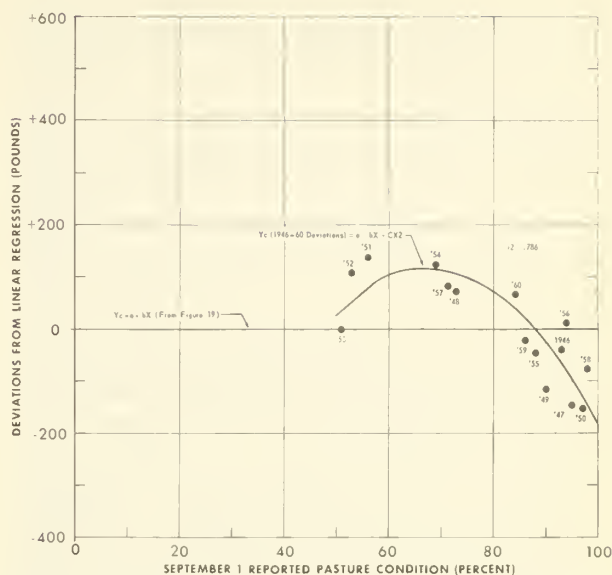


FIGURE 19.—Tobacco, Kentucky Type 31: Deviations from the least squares line on the chart in figure 18 are plotted here using pasture condition (index of soil moisture) as a second factor. Most of the variation in the yield indications not explained in figure 18 is now explained as demonstrated by the proximity of plotted points about the second degree (curved) line.

data for tobacco have been secured through the June enumerative survey. At present, most States that have a sizable acreage of tobacco are in the enumerative survey program.

Beginning in 1957, a research project to measure Burley yields through objective means was conducted in Kentucky. A similar project was conducted for Southern Maryland on the 1959–61 crops. Making field counts during the growing season to determine plant rates and determining weight of cured leaf per plant at stripping time were the basic steps employed to arrive at the yields. The Burley objective yield program is now operational in Kentucky and shows considerable promise. Pilot work to measure yields objectively was begun on dark types in that State in 1961.

PEANUTS

The official series of estimates for peanuts made by the Department of Agriculture dates back to 1909. Estimates are recorded on an annual basis by States and areas, covering items of acreage, yield per acre, production, farm disposition, season average price, and value.

Production of peanuts is confined mostly to Southern States. There are three main producing areas—Virginia-North Carolina, the Southeast, and the Southwest. In the Virginia-North Carolina area the bulk of production is of large-podded bunch and runner type peanuts. The major producing States of Georgia and Alabama, plus South Carolina, Florida, and Mississippi make up the Southeast area; here the crop is composed principally of two small-podded types—southeastern runners and Spanish. In the Southwest area, Texas and Oklahoma are the heaviest producers and grow Spanish peanuts almost exclusively; in New Mexico, most acreage is of Valencia—a roasting peanut.

In March, prospective acreage grown alone for all purposes for the current year is published. Estimates of acres grown alone for all purposes are also published in July and December.

The forecasting season for peanuts begins on August 1, at which time a prospective yield is applied to an estimated acreage to be harvested for nuts in order to derive a production forecast. Estimates are reevaluated each month through December, largely on the basis of condition and yield reports from producers; inspection data and other pertinent information are also used when available. Revised estimates relating to acres grown alone for all purposes, acres harvested for nuts, yield per acre, and production are published in the April Crop Production report each year for the two previous seasons.

Disposition estimates relating to the two past seasons are prepared for release each May. These items include quantities sold, used for seed, used at home, and fed and lost. Patterns of disposition for this crop change so gradually that the mailed disposition survey is rotated in such a manner that each peanut-producing State makes the inquiry about one year out of three.

Basic indications for use in establishing the various estimates and forecasts for peanuts are collected in a manner similar to those for other major crops, and often in conjunction with them. Chief sources of indications include: acreage surveys in March, June, and September; August through December Farm Reports; acreage and production survey; November Special Peanut Inquiry; and the April Peanut Disposition Inquiry. Acreage and yield indications are usually plotted

on simple correlation (dot) charts and read against the historic behavior of the particular series.

In addition to the regular mailed survey data collected, considerable supplemental or check data are available for use in the peanut program. Allotted acres, measured acres, and production are obtained from the Agricultural Stabilization and Conservation Service; inspection data are secured from the Agricultural Marketing Service; and milling information is available through the Peanut Stocks and Processing report prepared monthly by the Statistical Reporting Service.

This Peanut Stocks and Processing report is unique among reports prepared by the Crop Reporting Board. Under provisions of the Peanut Statistics Act of 1938, handlers of raw peanuts, other than the original producers, are required to submit to the Department monthly reports covering specified activities. Firms involved in reporting include approximately 120 shellers and crushers, 400 commercial processors, and 200 warehousemen. Principal items covered in the report are inventories, disappearance, millings, production of shelled peanuts and roasting stocks, quantities of peanuts used in various edible products, crushings, and production of crude peanut oil and meal. Highly detailed and comprehensive, the report is widely used by the Government and private industry. The entire report is prepared in Washington.

SUGAR CROPS

Sugarcane for Sugar and Seed

Sugarcane is grown for sugar in Louisiana, Florida, and Hawaii. For the July-November reports, forecasts and estimates relate to sugarcane for sugar and seed combined. Separate estimates are made of the two uses for the December Annual Summary and for the revisions which are published in the June Crop Production report following the year of growth. Production estimates for sugar and molasses are published in the December and June reports.

The period of growth of sugarcane varies by areas; it is harvested after a growth of about 9 months in Louisiana, 12 months in Florida, and 22 to 24 months in Hawaii. Planted acreage is

not estimated because of this variation in the growing season and the practice of harvesting more than one crop from each normal planting of seed. After the cane is cut, it grows again from the established root system; such a growth is called ratoon cane.

For Louisiana and Florida estimating procedures are essentially the same as for other field crops, but the majority of the indications are obtained from sources other than the regular grower surveys. Sugar factories in those States supply basic data on acreage for the July and December estimates, report monthly during the growing season on condition of the crop and expected yield, and furnish information on the production of cane and cane products for the Annual Summary. Data submitted by the sugar companies to the Sugar Branch of ASCS in the administration of the Sugar Act form the basis for the June revisions of all sugarcane estimates, which include those for production of sugar and of both blackstrap and edible molasses.

In Hawaii sugarcane is harvested throughout the year except for a short period around January 1. Statistics relate to the cane harvested and processed during the calendar year and to the sugar and molasses made. Beginning with the 1961 Annual Summary, sugarcane statistics for Hawaii were incorporated in all regular sugar tables of crop reports. Estimates are based on information obtained from the Hawaiian Sugar Planters' Association (HSPA) and final revisions are HSPA totals for the four islands.

Although Federal Census of Agriculture enumerations are available, it is not necessary to revise the annual data. Factory totals for Louisiana and Florida from ASCS records are complete, as are the tabulations of HSPA for Hawaii.

Sugarcane for Sirup

Estimates of acreage of sugarcane for sirup and of sirup yield and production are made only for Alabama, Georgia, Louisiana, and Mississippi once each year for publication in the December Annual Summary. These estimates are based on indications from the fall acreage survey and the Farm Report, except that for Louisiana additional indications are obtained from sirup mills and sugar factories.

The quantity of sirup consumed on farms where produced is the product of the rate of consumption per farm and the number of farms growing cane for sirup as enumerated in each census year and projected through intercensal periods. The remainder of the production is considered to be the quantity sold.

Census enumerations, the only available check data, are the basis for revisions.

Sugar Beets

Sugar beets are grown in the States extending from Ohio to the three Pacific Coast States. Publication of estimates of acreage, yield, and production follow the pattern of other field crops except that revisions are made in June following the year of production. The United States production of sugar beet products—sugar, molasses, and beet pulp—is included in the December and June reports.

The procedures used in estimating other field crops are followed. In addition to the usual indications from the regular acreage surveys and the Farm Report, basic data are supplied by sugar beet companies that contract the acreage and process the entire crop. For the July and December reports, these data are obtained on special questionnaires from the home offices of the sugar beet companies. The July acreage estimates are based largely on factory reports on acreage. Estimates published in the December Annual Summary are based chiefly on data furnished by the sugar companies, although indications from the regular surveys are considered. Sugar company estimates of expected yield are also used as indications in some States during the growing season. The June revisions are based entirely on final data submitted by the sugar companies to the Sugar Branch of ASCS in the course of administration of the Sugar Act.

Revisions of sugar beet statistics to the Federal Census of Agriculture base are not necessary, since the ASCS records supply complete check data annually.

Maple Sirup

Estimates of maple sirup production and disposition are now prepared for 11 States. The first production estimates are made in May; these are revised in December. Estimates of farm disposi-

tion for the crop marketing season are made in May following the year of production.

Questionnaires duplicated in the State offices are mailed to maple sirup producers once a year (in the spring). Responses received before the May due date are summarized and used as the basis for the first production estimate. Reports received after that time are included in the survey data for the December estimates. From this survey, indications for both locality and individual farms are obtained on annual change in number of buckets hung, sirup production, and yield of sirup per bucket hung. Production estimates based on these indications are made according to the methods used for field crops explained earlier in this chapter.

Estimates of farm disposition of maple sirup are based on the individual farm data reported on the special maple questionnaire. Percentages of production sold and used on farm where produced are computed from the reported individual farm data and used as independent variables in preparing State estimates. Information on price and proportion of the crop marketed by method of sale are also obtained from the special survey.

Revisions of production and disposition estimates are made following each quinquennial Federal Census of Agriculture. The Census enumerations furnish the only check data of any consequence.

SEEDS

Legume, Grass, and Cover-Crop Seeds

Before 1939, the Crop Reporting Board made estimates for only six seed crops—alfalfa, red and alsike clovers (combined), sweetclover, lespedeza, and timothy. These estimates were based largely on indications obtained from the rural carrier surveys, and the same methods of estimating were employed as for general field crops. The indications used were ratios to land and current/historic and identical relations. Largely to meet demands for more seed statistics and to avoid duplication of work, all seed-statistics work of the Department was consolidated under the Crop Reporting Board in September 1938. By 1949, the scope of reports on seed crops had broadened to include, besides the six seeds named, the following field seeds: lupine, smooth brome grass, crested wheatgrass, crimson clover, Ladino clover, meadow fescue, Chewings fescue, red fescue, tall

fescue, bentgrass, Kentucky bluegrass, orchardgrass, redtop, sudangrass, white clover, Austrian winter peas, common ryegrass, perennial ryegrass, common and Willamette vetch, hairy vetch, Hungarian vetch, purple vetch, Bermudagrass, sunflower seed, and mustard seed. Merion Kentucky bluegrass was added in 1952. For various reasons, meadow fescue, Willamette vetch, Hungarian vetch, Bermudagrass, alsike clover, and sunflower seed estimates have been discontinued, and common and perennial ryegrasses have been combined into an estimate for all ryegrass.

Seed crops are usually grown in localized areas, and considerable use is made of special inquiries in the seed estimating work. Questionnaires are mailed to special lists maintained by State offices. These lists include names of farmers growing seed crops almost every year as well as those harvesting seed crops intermittently. Growers report the acreage and production for the current and previous years for their own operations and such additional information for their locality as the date harvest began and yield per acre. On some early-season inquiries growers also report the acreage in their locality as a percent of the previous year. Information from growers is supplemented by reports from seed cleaners and dealers. Major seed crops are also on the rural carrier and acreage and production questionnaires. These comparatively large general-purpose surveys include coverage of both general-purpose and specialized farms. Seed crops are also included in State farm censuses in States making these annual enumerations.

Except for ryegrass, lespedeza, and mustard seed, two reports on acreage, yield, and production of each kind of field seed are issued annually—a forecast of production and a December estimate of production. The ryegrass seed program includes an estimate of acreage for harvest issued in March and a report on acreage, yield per acre, and production in December. For mustard seed, a report on acres harvested, yield per acre, and production is released by the Montana office in December. Since lespedeza seed is a late-harvested crop, forecasts were discontinued, and estimates are issued in December with the annual report. Data for the forecasts are obtained from growers after harvest gets underway. Reports from shippers and cleaners are also obtained at

that time. The growers' and shippers' questionnaires are designed to supplement each other and to provide indications of annual changes in acreage harvested, yield per acre, average date of beginning harvest, farm carryover of seed, and opening prices to growers.

The December estimate is based on rural carrier, acreage and production, and other after-harvest surveys, preliminary reports from cleaners, and other data available. This estimate is regarded as preliminary until the following year, when more complete check data, such as State assessors' enumeration of acreage and production, purchases by shippers and dealers, and acreage and production totals of certified seed become available.

Crop-check and other survey data are reappraised when the quinquennial Federal census reports on acreage and production of seed crops are released. Census benchmarks are used unless check data or other known items of disposition, such as farm use and farm sales, indicate a need to adjust the census figures.

Carryover of seeds on farms is estimated largely from data obtained from the questionnaires on which production forecasts are based. The general procedure in computing farm carryover is to determine what percentage the quantity of seed carried over by growers (farmers) reporting in a given State is of the total quantity they produced in the preceding year. This percentage, with possible minor adjustments suggested by other data such as those obtained from disposition surveys, is applied to the State production for the preceding year. Generally speaking, most of the seed grown for sale is sold by growers during the first 6 months following harvest, and the farm carryover constitutes only a small part of the total carryover in all positions. The major portion of the carryover of seed usually is held by dealers.

Dealers' carryover stocks as of June 30 are obtained from a mail survey. Questionnaires are mailed to every firm known to have carried over important quantities of a given kind of seed in past years. The questionnaire is designed to furnish a cross-check of seed owned or controlled by others but stored in the reporters' warehouses. These surveys, inaugurated in 1940, have covered more than 90 percent of the commercial stocks.

This degree of completeness of coverage requires much followup effort by mail, telegraph, and telephone. All stocks owned or controlled by the Government, if any, are included in the consolidated report of stocks held by dealers and the Government.

Vegetable Seeds

Two vegetable seed surveys are made annually, one as of February 15 and the other as of June 30. The February report covers final acreage and production for the preceding year and prospective acreage and production for the current year. Vegetable seed dealers report the carryover of seed annually on June 30.

NAVAL STORES

Statistics on production, consumption, and stocks of naval stores in the United States have been compiled and published by the Crop Reporting Board since 1947 when the collection of these data was transferred from the Bureau of Agricultural and Industrial Chemistry. Naval stores embrace all products of pine gum and related products derived from pine wood. The major products are turpentine and rosin; miscellaneous products for which statistics are collected are pine oil, rosin oil, dipentene, and other monocyclic hydrocarbons. Production of naval stores is concentrated largely in the Southeastern States where the higher-yielding species of pine trees grow in abundance.

Naval stores statistics, unlike most series for other crops, represent returns from all segments of the industry covered rather than estimates based on sample data. All information is collected directly from the industry by mail from Washington. Reporting is not mandatory, but the outstanding voluntary cooperation of producers, dealers, and consumers has made virtually complete enumerations possible.

Representatives of almost 100 production plants now in operation and of a few large concentration points fill out questionnaires on production and stocks each month. Four questionnaires are required to collect the data on three distinct types of production. One questionnaire covers gum naval stores—turpentine and rosin that are produced by the distillation of crude gum (oleoresin), which is obtained by "chipping" living

longleaf and slash pine trees. A second questionnaire elicits data on steam distilled naval stores produced from resin-saturated stumps of original growth forests; these stores include turpentine, rosin, dipentene, pine oil, and other monocyclic hydrocarbons. Two questionnaires cover by-products of the sulphate process of making paper from pulpwood; one of these questionnaires covers sulphate turpentine, the other, tall oil rosin (which is produced by fractionation of tall oil).

The reported data are reviewed carefully for omissions, duplications, and inconsistencies before being tabulated and summarized for publication by type of production. If deemed necessary, apparent discrepancies are called to the attention of the reporter, either by letter or telephone. Reports not received before the deadline for preparation of the release are secured by wire or telephone, thus assuring complete production coverage.

At the end of the crop year (March 31) questionnaires are sent to approximately 300 rosin and turpentine consumers whose reports cover all but a very small percentage of the consumption in the United States. Two inquiries are used for collecting consumption by industry categories and stocks at industrial plants: (1) A processor's report for firms (usually also producers) that use turpentine and rosin as raw material in making chemically modified or derived products, primarily for sale, and (2) a consumer's report for plants manufacturing specific products. In addition, about 300 inquiries are sent to jobbers and wholesalers to secure turpentine and rosin stocks at distribution points other than for retail sale. The information obtained annually receives the same close scrutiny and careful attention as the monthly data. Securing data without duplication is a major task, since many of the companies are very large corporations with complex subsidiary and affiliated organizations.

Data compiled monthly and annually, along with data on imports and exports collected by the Bureau of the Census and on loan stocks supplied by the Commodity Credit Corporation, are brought together in the annual report to show supply and distribution of turpentine and rosin by types of production. Price information from the Market News Service is used in computing value of gum naval stores.

Since naval stores statistics are actual reported data rather than estimates, periodic revisions to true up the statistics are unnecessary. Census enumerations and other check data similar to that used for most crops (except for the CCC stocks and imports and exports) are not available. Computed domestic disappearance serves as an indirect check on reported consumption.

MEAT MEAL AND TANKAGE

The systematic gathering of monthly information on the production and distribution of meat scraps and feeding tankage was started in July 1944 to supplement data on farm production and stocks of feed grains, hay, and roughage. This work was initiated at the request of the War Food Administration to provide needed data on the overall feed situation and to serve as an aid in the allocation, if it became necessary, of animal byproduct feeds as a part of the program for protein meals. Before 1944, feed grain statisticians had assisted the Office of Price Administration in tabulation of reports of collection and use of waste fats; this work provided the names of plants, which formed the nucleus of the list used for the meat scraps and tankage survey.

Starting in July 1944, monthly questionnaires were mailed which asked for production of these products during the previous month and distribution of shipments by States. The first public release, issued on June 25, 1945, presented State and national production and shipment data by quarters from July 1944 through March 1945. A second release on August 21, 1945, gave monthly production for the July 1944-June 1945 period for the Nation and information on production and distribution, by States, for the April-June 1945 quarter. In September 1945 the survey was changed from a monthly to a quarterly basis. Production was asked for each of the previous 3 months, but questions on shipments were dropped since this information was no longer needed for wartime administrative purposes. Quarterly surveys and releases giving monthly production with comparisons were continued until 1952. In order to reduce workload, the meat scraps and tankage surveys were cut back to the January 1 and July 1 dates in 1952. These semiannual surveys have been continued since then. Each survey now

covers monthly production for the previous 6-month period.

Since their inception, the surveys have been conducted from Washington. Questionnaires are mailed to all known producers of meat scraps and tankage. The initial list obtained from the Office of Price Administration was considered to be practically complete, and constant effort has been made to keep it up to date. Names of new producers are obtained from industry organizations, equipment manufacturers' publications, and field statisticians who have contacts with State licensing agencies and slaughterers. Survey procedures call for a second mailing to nonrespondents and a followup contact by telephone or telegram to important producers who have not reported.

Before the January 1958 report, the data published were the survey reported totals and a statement giving the estimated percent of coverage. Until 1950, the tonnage summarized was considered to be an enumeration of plants covering about 95 percent of the producing capacity. Beginning with April 1950, the coverage was broadened to include about 98 percent of the producing capacity. Intensive work in 1957 extended the coverage to a practically complete canvass of producers. At the same time, the questionnaire and

instructions were changed to assure that poultry byproduct meal was included in the reported production. Feather meal is excluded because only a minor amount of this product is used in feed. Also in 1958 the term "meat meal" was used in place of "meat scraps" to more closely designate the product in accordance with definition and trade preference.

Since 1958 the survey summarization procedure has made allowances or estimates for missing reports based on historic records and changes in similar plants. Totals shown in the release are rounded to 100 tons to avoid the appearance of complete accuracy and to allow for the possible omission of new producers from the survey coverage.

The survey of meat meal and tankage is conducted as a part of the Field Crops statistics program of providing data on feed production. The number of producers has expanded from about 450 at the time the survey started in 1944 to around 800 in 1963. The combined output of meat meal and tankage has likewise increased from about 65,000 tons per month in 1944 to 140,000 tons per month in 1962. These changes point out the importance of statistics on this segment of the feed supply.

CHAPTER 4. VEGETABLES AND POTATOES*

Estimates for vegetables cover three major groups—fresh market vegetables, vegetables for processing, and potatoes and sweetpotatoes. Included with fresh market vegetables are cantaloups, watermelons, and strawberries (table 2).

The first Government estimate of the potato crop (of production by States) was published in the annual report of the Commissioner of Patents for the year 1841. In 1862, estimates of acreage and yield per acre were published by the Commissioner of Agriculture. The following year, publication of the condition of the crop was inaugurated. Sweetpotato estimates were started in 1868. From 1868 until 1909, potato and sweetpotato estimates included only acreage, yield per acre, production, and prices on December 1.

Estimates of farm disposition and season average prices began in 1909, and monthly forecasts of potato and sweetpotato production began in July 1912. Commercial vegetable estimates for onions and cabbage were started by the Department in May 1914. By the close of 1916, releases on vegetables had been expanded to cover acreage, yield, and production of: cabbage, celery, onions, cantaloups, watermelons, and strawberries for fresh market; sweet corn, peas, and tomatoes for processing; and cucumbers for pickles.

Potato stocks reports were added in 1924. As the program expanded still further, the field work, including making mailed inquiries, was taken over by the State offices. The decentralization of the work on fresh market vegetables was completed in April 1944.

Fresh vegetable estimates include 27 vegetables and melons. Estimates are also prepared for peppermint and spearmint for oil and strawberries. In 1963, fresh market vegetables were estimated in all States except Montana, North Dakota, South Dakota, Vermont, and West Virginia. The most recent States to be added were Alaska with 3 vegetables and Hawaii with 10.

Processing vegetable estimates now include 10 principal crops. Decentralization of the program for processing vegetables has been planned but

has not yet been accomplished. While some field offices make all or part of the estimates for their State, most of the program is still handled from the Washington office.

FRESH VEGETABLES

Scope

Current estimates for fresh market vegetables include all production grown primarily for sale. These include vegetables grown for sale on local markets as well as for shipment to distant markets. Estimates on this basis extend back to 1939. Prior to 1939 estimates relate to production in well-recognized commercial areas that produced mainly for shipment to distant markets. They do not include some local production near consuming centers. Consequently, estimates for years prior to 1939 are not strictly comparable with those from 1939 to date.

Another significant change in fresh vegetable estimates occurred during the review of the 1954 Census of Agriculture. At that time, all fresh market vegetable estimates on yield per acre, production, and price were changed to a weight basis. The unit adopted for vegetables was hundredweight; estimates have been published in this unit from 1949 to date. Also, at the same time, the unit for strawberries was changed to pounds. Vegetable estimates do not include production for home use from farm and non-farm home gardens.

At 5-year intervals, after the data from the Census of Agriculture are obtained, the vegetable program is given a careful review. At this time, estimates of those crops which are no longer commercially important are dropped, and those which have become important are added. As a result, changes are made periodically in the number of crops and States to keep abreast of changing situations. This has little effect on overall production estimates since those dropped from the

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TABLE 2.—Statistical Coverage of Vegetable and Related Crops

Crop	Acreage			Production	Stocks	Disposition	Prices received by farmers ¹	Value of production	Value of sales	Semi-monthly progress report
	Intentions	Planted	Harvested							
Vegetables for fresh market: ²										
Artichokes		X	X	X			X	X		
Asparagus	X	X	X	X			X	X		
Beans, green lima		X	X	X			X	X		
Beans, snap		X	X	X			X	X		
Beets		X	X	X			X	X		
Broccoli		X	X	X			X	X		
Brussels sprouts		X	X	X			X	X		
Cabbage	X	X	X	X	X		X	X		
Cantaloups		X	X	X			X	X		
Carrots		X	X	X			X	X		
Cauliflower		X	X	X			X	X		
Celery		X	X	X			X	X		
Corn, sweet		X	X	X			X	X		
Cucumbers		X	X	X			X	X		
Eggplant		X	X	X			X	X		
Escarole		X	X	X			X	X		
Garlic		X	X	X			X	X		
Kale		X	X	X			X	X		
Lettuce		X	X	X			X	X		
Melons, honeydew		X	X	X			X	X		
Mint, for oil		X	X	X			X	X		
Onions	X	X	X	X	X		X	X		
Peas, green		X	X	X			X	X		
Peppers, green		X	X	X			X	X		
Shallots		X	X	X			X	X		
Spinach		X	X	X			X	X		
Strawberries	X	X	X	X			X	X		
Tomatoes		X	X	X			X	X		
Watermelons	X	X	X	X			X	X		
Vegetables for commercial processing:										
Asparagus		X	X	X			X	X		
Beans, green lima	X	X	X	X			X	X		
Beans, snap	X	X	X	X			X	X		X
Beets	X	X	X	X			X	X		
Cabbage for sauerkraut	X	X	X	X			X	X		
Corn, sweet	X	X	X	X			X	X		X
Cucumbers for pickles	X	X	X	X	X		X	X		
Peas, green	X	X	X	X			X	X		X
Spinach		X	X	X			X	X		
Tomatoes	X	X	X	X			X	X		
Potatoes and sweetpotatoes:										
Potatoes ²	X	X	X	X	X	X	X	X	X	
Sweetpotatoes	X	X	X	X		X	X	X	X	

¹ Includes prices by utilization groups.² For each crop, separate estimates are made for winter,

spring, summer, and fall seasons, with appropriate sub-groupings (early, mid, late) under each season.

program are very minor and crops are generally added before they become extremely large.

In 1963, fresh market vegetables were estimated in all States except Montana, North Dakota, South Dakota, Vermont, and West Virginia. The most recent States added to the program were Alaska and Hawaii. In Hawaii, estimates for six vegetables were made starting with 1954, and four additional ones were estimated starting with 1960. Estimates were begun in 1960 on three vegetables in Alaska.

Estimates are published for 27 fresh market vegetables and melons: artichokes, asparagus, green lima beans, snap beans, beets, broccoli, brussels sprouts, cabbage, carrots, cauliflower, celery, sweet corn, cucumbers, eggplant, escarole, garlic, kale, lettuce, onions, green peas, green peppers, shallots, spinach, tomatoes, cantaloups, honeydew melons, and watermelons. In recent years, these 27 crops, which are grown commercially in the more important producing States, provide statistics on about 85 percent of the national output of all vegetables and melons grown for fresh market. Important producing States are shown in figure 20. Once a year, an estimate for total vegetables is prepared and published. This includes an estimate for these 27 crops in States not included in the regular program, as well as an allowance for many miscellaneous vegetables. Regular forecasts are also published

on peppermint and spearmint for oil and strawberries.

Commercial vegetables are harvested somewhere in the United States every month. Except for the cabbage and onions put into storage, fresh vegetables are, for the most part, extremely perishable and must be handled quickly to avoid heavy losses from spoilage. Production prospects can change rapidly during the growing season, as vegetables are generally very sensitive to weather changes. Insects and diseases can be serious problems. Because of the rapid pace of marketing and possibilities of damage to growing crops, timeliness is of utmost importance in publishing vegetable forecasts.

Vegetables are generally short-season crops. Therefore, estimates are most useful when prepared on a seasonal basis. Seasons are established on the basis of the time that harvest is most active. Separate estimates are made for that part of each crop marketed during each period. The calendar year is divided into 3-month periods—winter, spring, summer, and fall. These in turn are subdivided into periods of 1½ months (early and late) or 1 month (early, mid, and late). Figure 21 indicates the months included in each seasonal group. The number of subgroups into which the estimates for each season are broken is determined by the length of the harvesting

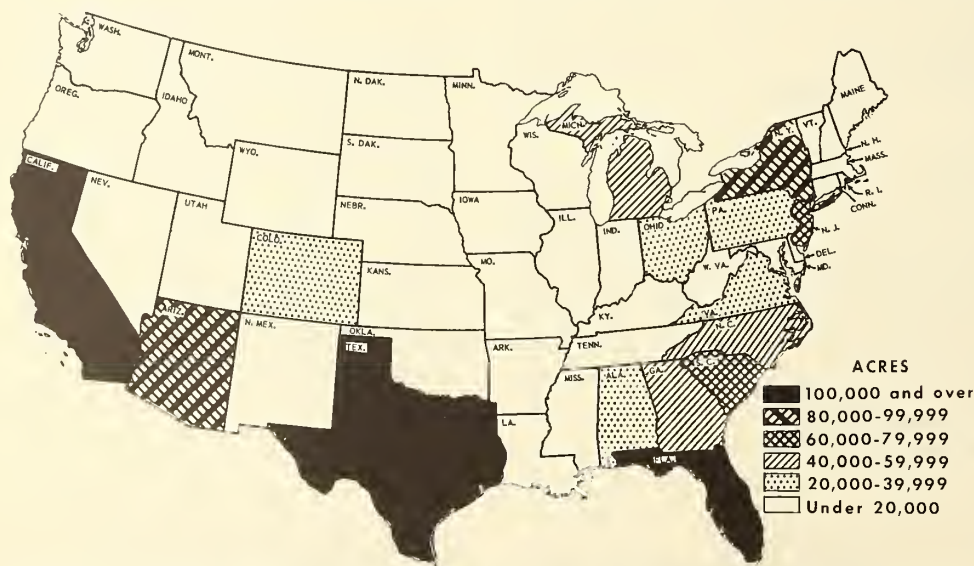


FIGURE 20.—Acreage planted to fresh vegetables in important fresh vegetable producing States, 1962.

season and the number of competing areas that ship within the season.

Some overlap between seasonal groups is unavoidable, especially among crops with relatively long harvest periods. Weather frequently disturbs the marketing patterns and causes overlapping of seasons. Consequently, the classifications employed are frequently less precise than the dates indicated. As the bulk of each crop is harvested in the season shown, the segregation is useful in approximating supplies in each quarter or seasonal period. In the published reports, States are arranged within each seasonal group in geographic order.

Up to and including all estimates on the 1956 crops, yield and production were published in such various quantity units as bushels, crates, and sacks. Beginning with the first forecast for the 1957 crops, yield and production were published on a weight basis. The unit used for vegetables and melons is hundredweight, and the unit

for strawberries is pounds. Revisions have been published on a weight basis as far back as 1949. Reasons for changing from the heterogeneous units to a uniform weight basis include: (1) Containers used for some vegetables are not uniform. (2) Impracticality of altering production estimates to reflect the constant evolution in vegetable packages. (3) Changes in packing practices and varieties result in variations in weight of individual containers. (4) Measurement of production and marketings in terms of weight is becoming more general.

Methods of Arriving at Estimates

Most of the production of fresh market vegetables is concentrated in areas that are particularly adapted to specific crops. The plantings in these areas are often dominated by distributors or grower-shippers. However, in some areas a crop is grown by many producers, usually on general farms. This is particularly true for such crops as snap beans, cabbage, sweet corn, cucumbers, tomatoes, cantaloups, watermelons, and strawberries.

In these areas, reports collected by mail regarding plantings on individual farms provide a suitable basis for the estimates. Names of vegetable growers are obtained from rural carrier cards, market managers, county agricultural agents, grower associations, inspection service, dealers, and others. The general methods of collecting information by mailed inquiries and analyzing information on fresh market vegetables are similar to those used with other crops. Indications of acreage from mailed surveys are obtained by comparing current acreage with that reported for the previous year on the same questionnaire (current/historic) and in some cases by comparing with the acreage reported on the same type of questionnaire a year earlier (current/current). These are read on regression charts. Yield indications from mailed surveys are either condition or probable yield, and these are also read on regression charts. The yield indications can be for either a farm or a locality. These are discussed in more detail in chapters 2 and 3. Copies of typical vegetable questionnaires are shown in Appendix A, exhibits 12 through 15.

In areas where the crop is a specialty and production is dominated by a few people, personal

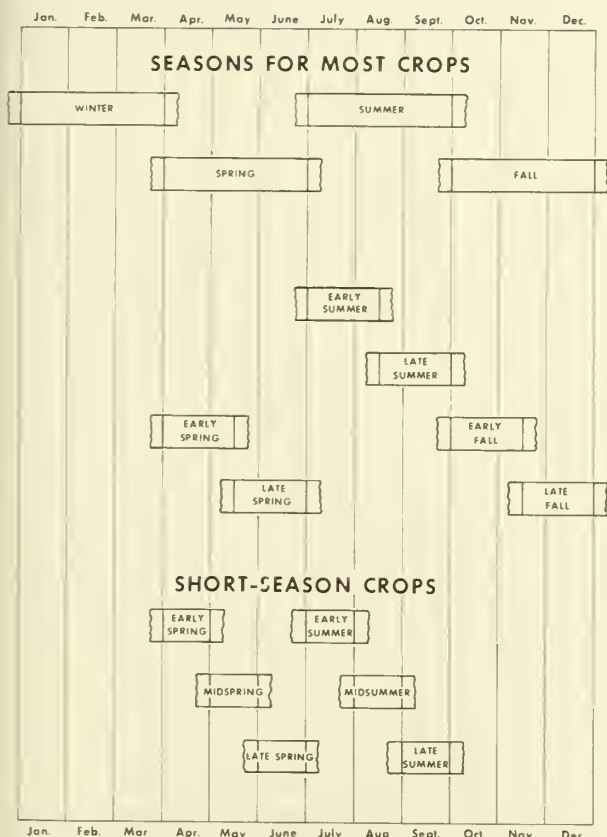


FIGURE 21.—Seasonal groups used for fresh market vegetables.

visitation by a trained field statistician is required. Some large operators who are in a position to report on a local situation and who may be indifferent to mailed inquiries will gladly cooperate by giving full details in personal interviews with a field statistician. Objections to answering mailed inquiries are not always based on unwillingness to give the information. Sometimes a grower feels that Government estimates cannot be accurate unless they are based on personal observations by a competent statistician. During his visits with growers, dealers, cooperative associations, bankers, and others associated with the vegetable industry, the statistician obtains information on number of acres planted, the general condition of the crops, probable yield per acre, the date when harvest will begin, time when peak movement is expected, quality of the product, prices being received by growers, and other pertinent facts concerning the crop. With the limited time available, he seldom interviews all growers in the locality or makes many repeat visits during the season.

Vegetable crops are susceptible to sudden damage by adverse weather, such as frosts, floods, or hurricanes. When these occur a prompt evaluation of damage is usually necessary. A field statistician may telephone or telegraph a special damage report to Washington from a field point. Usually, however, he returns to his State office, where he has access to other information and is in close contact with the Weather Bureau, before submitting his damage report. The report is released immediately from Washington to all parts of the country. The damage report may be in the form of general statements on the condition of the crop and probable losses, or it may be in the form of a specific change in the production forecast.

Much of the information obtained from mailed surveys on vegetable crops is collected on a locality or shipping-point basis. Key contacts are usually growers, officials of cooperatives, marketing associations, auction managers, county agents, or shippers. As vegetable growing is often concentrated in restricted areas where the number of growers is small, it has been found that there are enough interested and observant growers and others who are sufficiently well informed to furnish satisfactory judgment figures for their lo-

calities or shipping points. An average of such locality data usually gives a reliable indication of prospects even though the reports may be relatively few.

Crop acreages are based on two principal sources—the mailed inquiry and enumeration. The total enumeration approach to acreage is being used on many crops in a few States. In general, vegetable questionnaires ask two types of acreage questions: (1) Acreage planted the current year on the respondent's farm and acreage harvested the previous year; these acreages are summarized and the percent change computed, and (2) a judgment inquiry, which asks the respondent to give for his locality a percentage change in acreage from the previous year; these percentages are totaled and an average percent change calculated.

Since growers who voluntarily report on questionnaires are not always representative of the universe, it is necessary to allow for any consistent bias in the reports. This is done by using a simple regression chart. Reported percent change indications are plotted on the X axis and final percent change in acreage is plotted on the Y axis as shown in figure 22.

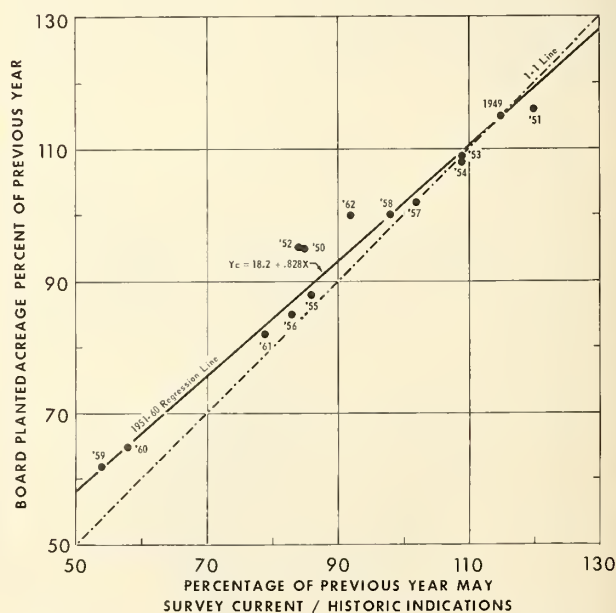


FIGURE 22.—Tomatoes, Georgia, late spring season, preliminary acreage: Regression of grower reported percent of previous year on final planted acreage percent change.

Enumeration of acreage in an area may be done by the statistician. Other enumerations are also used, such as an enumeration: for an irrigation project; by a marketing committee, county commissioner, or county agricultural agent; from inspection services, grower associations, and co-operatives; or by another individual. Area estimates are then added for a State total.

Estimates of planted and of harvested acreage are prepared for all crops. Acreage intentions are prepared for five crops—asparagus, cabbage, onions, strawberries, and watermelons. Except for asparagus and strawberries, intentions are published before planting gets underway. This permits growers to change their plans after they examine the intentions report. Planted acreage and acreage for harvest of other crops are generally estimated just before the beginning of harvest and are revised if necessary after the crop has been marketed and all the check data are available.

Every 5 years, Statistical Reporting Service estimates for fresh vegetables are reviewed in the light of a new Census of Agriculture, and a benchmark acreage for the census year is determined. In making this determination two main points must be kept in mind. First, census enumerations are not always strictly comparable with SRS estimates for fresh vegetables because the census enumeration is for fresh and processing vegetable acreage combined; therefore, the two separate SRS estimates for these items must be totaled before a comparison is made. Second, the census enumeration may be too low; independent surveys, production check data, and utilization records often indicate this to be the case.

Some of the reasons a census enumeration may be too low: (1) It may not always reflect the full acreage devoted to a succession of short-season vegetables; these successive crops are likely to puzzle census enumerators unfamiliar with them. (2) Because the census is taken in the fall, growers in winter producing areas may forget to report the acreage that was grown the past winter or the acreage they intend to have in the months following the enumeration. (3) If different growers farmed the same land during the year, the enumeration may not account for the year's total acreage for that land.

Once the benchmark acreage is established, the change (if any) in acreage is ascertained from one year to the next. For this, acreage indications are obtained at several stages of development of the crop, the basic analysis being the same for each stage; in this analysis the main problem is the elimination of bias in reported data. Often this review process shows the acreage currently carried is in agreement with the benchmark acreage and therefore no change is necessary.

The general all-purpose sample now in use in enumerative survey work is not well adapted to vegetable crops because it is not designed to cover a crop that is highly concentrated in a few areas rather than scattered widely over a State.

Several States have special projects for estimating vegetable acreages. The muckland survey in five counties of New York has been in operation for several years. Enumerators make field trips early in the growing season into each area—identify the crop and determine the acreage in each field.

A special tomato project has been in operation in Florida and Texas for several years. By field enumeration and telephone calls, the acreage planted each week is determined and published simultaneously in the two field offices and in Washington. After the crop gets underway, the acreage in each stage of growth, that is, prefruit, fruit set, harvested 1, 2, 3 or more times, and completely harvested, is published. Narrative comments are also issued. This report is released on Tuesday covering the previous week.

A special acreage report on celery covers California, Arizona, and Florida. This monthly report includes acreage planted during the previous 5 months and acres growing on the first of the current month. It is released simultaneously on the 4th of the month in the field offices and in Washington. Acreage is obtained by enumeration. The nature of vegetable production and the rapid changes that take place create a great demand by the vegetable trade for these market-flow type reports. Increased service through market-flow reports, however, will depend on the facilities available. Some States, particularly Florida and California, have expanded this type of report to other vegetables.

Acreage estimates are normally made at the

same time as the first forecast of production, although for some crops the acreage for harvest is published a month before the first forecast. Ideally, the first forecast would be released just before harvest begins. This timing is adhered to as closely as possible, but sometimes the marketing pattern of a State does not coincide exactly with the seasonal group, or weather hastens or delays the harvest.

Yield estimates are based on mailed or enumerated data. Mailed questionnaires ask condition of the crop or probable yield per acre. Condition is reported as a percentage of normal. These reported percentages are averaged and plotted against final yields for previous years on a regression chart. Reported probable yield is also averaged and plotted on a regression chart such as the one shown in figure 23. The reading from the regression chart eliminates reporter bias. Shifting of vegetables to more productive land, more liberal application of fertilizer, improved cultural practices, and use of new higher yielding varieties and improved insecticides all result in an upward trend in yield. In forecasting yields, an allowance for trend must be taken into consideration. For example, a given crop condition may result in a higher final yield now than in the earlier years. Additional data are obtained by field travel and personal interview and interpreted in terms of final yield on the basis of past relations between similar reports and the final outturn. In some cases yield data are obtained entirely by enumeration. Data are collected in much the same manner as acreage statistics. Forecasts of production are also checked against marketings as the season progresses, taking into consideration the earliness or lateness of the season.

Some work has been done in the Statistical Reporting Service on objective methods of estimating yield of vegetables. For example, the Michigan office has for several years been doing objective yield work on onions. In this project, onions from a sample plot are weighed each week for several weeks before harvest to establish a growth pattern which is an aid in predicting yields. Onions from the sample plot are weighed at harvesttime to determine the final yield per acre. Some States have used counts of crates in fields of onions or lettuce as an aid in estimating final yields.

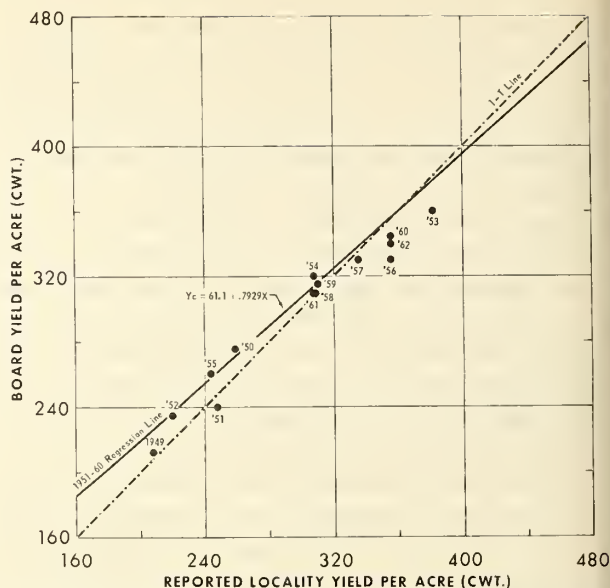


FIGURE 23.—Onions, New York, late summer season, yield: Regression of grower reported yield on final yield per acre.

Production estimates are the product of estimated acreage for harvest and yield per acre. After the season is completed, various kinds of check data are available on production. The most common check data on fresh production are the number of trucks unloaded at major cities and the number of rail cars shipped as reported by the Market News Service. The number of trucks unloaded and the number of rail cars shipped are converted to a weight basis, then combined and charted against fresh market production. Because the number of truck unloads is not complete in all cities, fresh production estimates exceed truck unload data. The amount of incompleteness in these data varies considerably by States and commodities. The percentage of incompleteness for one crop cannot be applied to the recorded shipment data of another crop to arrive at production. But the year-to-year change in recorded data for a particular commodity and State gives a good indication of the production change. Movement is plotted against production on regression charts similar to those used for acreage and yield.

In States in which most vegetables are inspected, records of inspections are used as check data rather than truck unloads and rail shipments

since these records are much more complete. Where inspections are compulsory, the volume inspected serves as an excellent check on production. In some States, where produce is checked as it leaves the State, these border passings, together with local use, serve as an excellent check on fresh production. (See fig. 24.) Auction market sales and cooperative association records provide other check data. The source, or combination of sources, which is most complete is generally the one used as a check on fresh production.

There are 10 vegetables for which estimates are published separately on the processing portions of the crop. These are asparagus, green lima beans, snap beans, beets, cabbage, sweet corn, cucumbers, green peas, spinach, and tomatoes. These processing estimates are described in the following sections. In recent years, especially since the advent of freezing, processing of crops formerly used only as a fresh commodity has become more important. As the trend developed, the processing portion has been estimated as a part of the total crop and included along with the fresh portion for these vegetables. Information on the processing segment is gathered from processors. Broccoli, brussels sprouts, carrots, and cauliflower estimates include large amounts for processing. When the processing portion of a crop becomes significant and there is a sufficient number of

processors so that data for individual firms are not divulged, separate estimates are usually published.

Production estimates are checked each 5 years with pertinent census data. For most vegetables, the census collects only an acreage figure, but production is checked when acreages are reviewed. For some crops, such as strawberries and mint, the census enumerates production as well as acreage. Census production is used as a check on current production estimates by much the same procedure as that described for census revision of acreages.

Prices for fresh market vegetables are estimated by half-month periods. These are combined into monthly prices, which are weighted by monthly marketings to arrive at the season average price for fresh market sales. Prices are generally obtained from mailed inquiries, Market News quotations, or quotations from other sources. Various types of check data are available for comparison with monthly vegetable prices. Estimated prices are those received by the grower at the most common point of sale, which usually results in an f.o.b. quotation. End-of-season questionnaires provide a basis for revising monthly price levels. Many State Statisticians collect information on vegetable prices during their regular course of field travel.

Monthly prices pertain only to produce going to the fresh market trade. These are estimated and published, by States, early in the following calendar year. The season average price computed from this series is applied to the fresh market production to arrive at the value of the crop produced. For those crops which are also processed, the processing price is obtained at the end of the year from processors. The weighted average price is applied to the processing portion of the crop to arrive at the value of production. In these dual-purpose crops, the production for fresh market is added to the processing production to arrive at a total, and the two computed values are added for total value.

VEGETABLES FOR PROCESSING

Scope

Commercial vegetable processing, as used in connection with official estimates of the Statistical Reporting Service, is defined as canning, freezing,

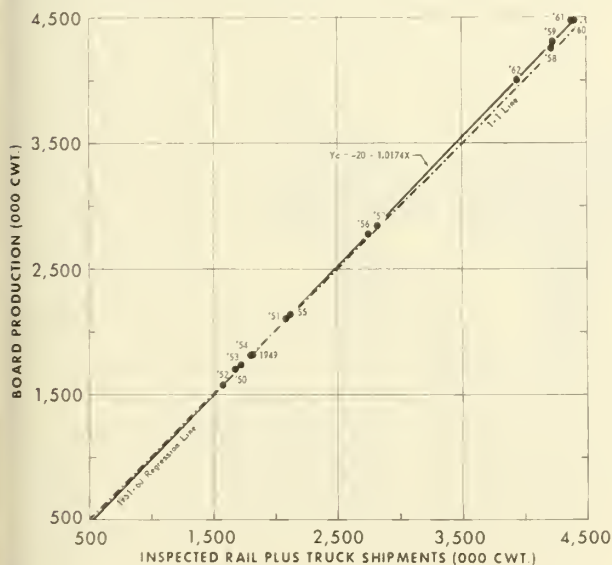


FIGURE 24.—Lettuce, Arizona, early spring season, production: Regression of rail and truck inspections on final production.

pickling, and other processing of vegetables by firms organized to process agricultural products and sell their output for public consumption. Home canning, home freezing, and institutional processing are thus excluded. A comprehensive program of monthly and bimonthly reports is carried on for the 10 principal processing vegetable crops. Those included are: asparagus, green lima beans, snap beans, beets for canning, cabbage for kraut, sweet corn, cucumbers for pickles, green peas, spinach, and tomatoes. The relative importance of producing areas is shown in figure 25. Although significant quantities of broccoli, carrots, cauliflower, celery, garlic, onions, artichokes, and brussels sprouts are also processed, they are of minor importance in proportion to the principal processing crops, and, in most cases, constitute a small part of the total production of the individual crop. That portion of these minor crops utilized for processing is therefore included in the total crop estimates and covered in the program for fresh market vegetables. The small quantities of vegetables used for commercial dehydration are also included with the fresh market estimates.

While total vegetable production has kept pace with the increasing national population, the relative importance of vegetables produced for processing has increased sharply since World War II. By 1962, well over one-third of all vegetables pro-

duced were being used for freezing and canning. Utilization by canners has shown a consistent uptrend since 1945, but development and growth of the frozen food industry is the principal factor in the increasing output of the processing industry.

The program of estimates for processing vegetables covers: (1) intended acreage, (2) acreage planted, (3) in-season forecasts of production, (4) annual summary of acreage planted, acreage harvested, yield per acre, production, season average price to growers, and value, and (5) revisions. Also published are narrative comments on these vegetables during the planting and growing seasons, percent condition ratings of growing crops, and estimates of pickle stocks.

Prospective or intended acreage reports issued before actual planting of each crop reflect early plans of processors for the coming season. These reports serve as a guide to the industry and to growers in adjusting their plans for the coming year.

Immediately after the planting season, an estimate is made of acreage actually planted. This estimate serves as the basis for estimates of acreage for harvest, which are in turn used in conjunction with anticipated yield to arrive at forecasts of production during the growing season. These production forecasts are made at the beginning of each month from June through

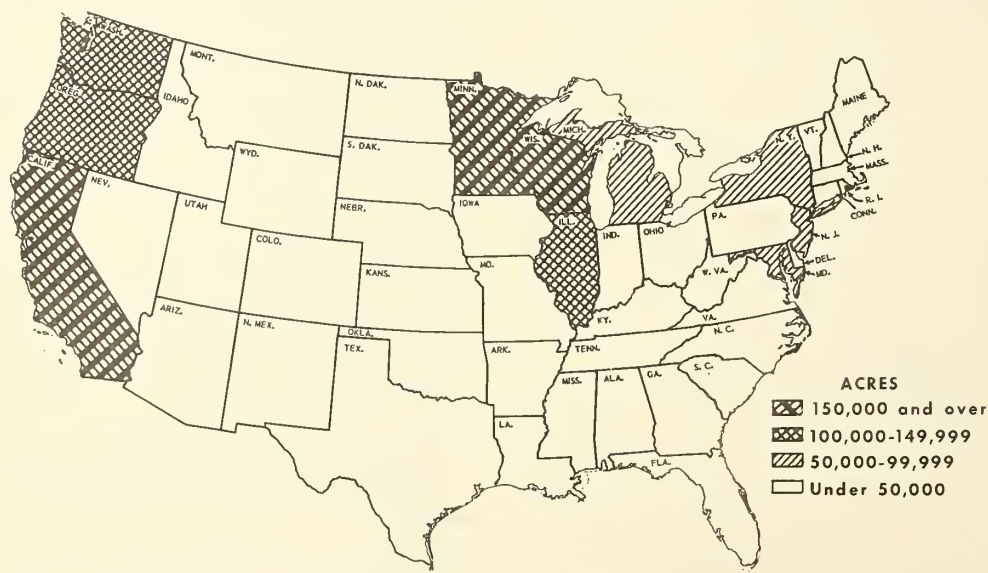


FIGURE 25.—Acreage planted to processing vegetables in important processing vegetable States in 1962.

October for most crops. Forecasts of green pea production are issued in mid-June, July 1, and mid-July. Preliminary production of cucumbers for pickles and October 1 stocks of pickles are reported in November. Acreage, yield, and production estimates for asparagus processed are reported in the annual summary.

The annual summary, published in December, is a comprehensive report covering acreage, yield, production, price, and value for all 10 crops included in the processing vegetable program.

Data for most crops are compiled to show the acreage and production separately. Type and variety data are also compiled and published to meet special needs of packers; estimates for green lima beans for freezing, for example, are broken down into Fordhook and baby lima types. The preliminary acreage report for green peas includes data on smooth round, semisweet, and sweet wrinkled varieties. At the beginning of the season, planted acreage of white and yellow sweet corn and of green and wax snap beans is published. Estimates are published by States in as much detail as permissible. However, the amount of detail that can be published from information obtained from such a small universe as the processing industry is strictly limited by the prohibition on disclosing confidential information discussed on page 7. For States where publication would entail disclosure of a single firm's position, estimates are grouped together in an "other States" total. Changes in the universe through company liquidation, consolidations, formation of new companies, and so on, frequently require changes in the publication of detail for various crops. Publication of utilization, type, and variety estimates is limited to national or regional totals as a result of disclosure restrictions.

Methods of Arriving at Estimates

The methods used by the Statistical Reporting Service in making estimates of vegetables grown for processing are unlike those used for most other crops. Inasmuch as utilization is controlled completely by the relatively small number of companies engaged in processing vegetables, these business firms become the logical source of primary data rather than the growers. In addition, processors are the best source of basic data for

a number of other reasons: (1) They maintain detailed records of quantities of raw products delivered to the plants and prices paid for them; (2) they grow on their own or on leased farms much of the raw product used in their plants; (3) to assure supplies and an orderly flow of raw materials to the plants, most processors enter into some kind of contractual agreement with growers and thus are fully informed on total acreage available to them; (4) field representatives of the processing company are in constant contact with conditions affecting the crop, yield prospects, and so on. It is also more economical to obtain primary data from the vegetable processors than to attempt to effect an equal degree of accuracy in estimates by surveying many more growers.

While processors offer an economical source of accurate basic data, the small universe presents problems in survey methods. Because firms differ so widely in size and type of operations, sampling methods within the small universe would not provide reliable statistics. Consequently, estimates are based on enumerated data obtained from processors. Effort is made to secure a complete enumeration, especially for acreage reports and for the annual summary. Processors generally recognize the importance and value of the reports issued and cooperate readily with mailed surveys. Examples of typical questionnaires are shown in Appendix A, exhibits 16, 17, and 18. For most surveys, the initial mailing of questionnaires is followed by one or two additional mailings to nonrespondents. Those firms failing to reply to any of the series of mailed requests are asked either by wire or telephone for their reports. Normally, this concentrated effort to secure reports from nonrespondents involves only a few firms.

Official estimates are thus, for the most part, a summation of enumerated data, by States, for the entire universe. When, for some reason, a complete enumeration is not obtained, estimates for nonrespondent firms are made on the basis of their operations in recent years. These estimates are added to enumerated data for companies cooperating with the survey. This method has been found to produce more reliable statistics than assuming a change in operations for nonrespondents equal to that of respondents. Normally, it is

the smaller firms for which approximations must be made; their operations are at a relatively fixed level and have only a limited influence on State totals.

In addition to contract operations, many processors also buy part of their raw products on the open market. The extent of open market purchases depends largely on weather and price and cannot be determined with any degree of accuracy until the end of the growing season. Consequently, an allowance for open market acreage and production is made during the season on the basis of open market activities in recent years. At the end of each season, open market purchases are enumerated and an equivalent acreage allowance is added to contract and "own farm" data reported by packers.

At the beginning of the forecast season, acreage for harvest is established on the basis of past relations between acreage planted and acreage harvested. This estimate of acreage for harvest is normally used throughout the season, and forecasts of production are determined from it and subsequent yield expectations. Forecasts of yields are made from a simple graphic regression analysis of probable yield and percent condition reported by processors. In this analysis, an allowance must be made for trends in yield brought about through changing cultural practices and areas of production. Typical regression charts used in forecasting yields for processing vegetables are shown in figures 26 and 27.

Except in 21 States (New England, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, Tennessee, Louisiana, Texas, Utah, and California) where the processing vegetable program has been wholly decentralized to the State field offices, most of the surveys and estimates are handled directly by the Washington, D. C., office. In States where part or all of the program has been decentralized, basic data are compiled and recommendations for the decentralized crops are made by the respective State Statisticians. The State Statisticians' recommendations are reviewed in Washington, D. C., by commodity specialists and coordinated with the centralized program carried on from Washington.

An integral part of this coordination process is the "clearing house" function of the Washing-

ton office in the exchange of survey data. Most large firms obtain their raw products from a number of States and operate plants in many locations. Nearly all prefer to report operations for

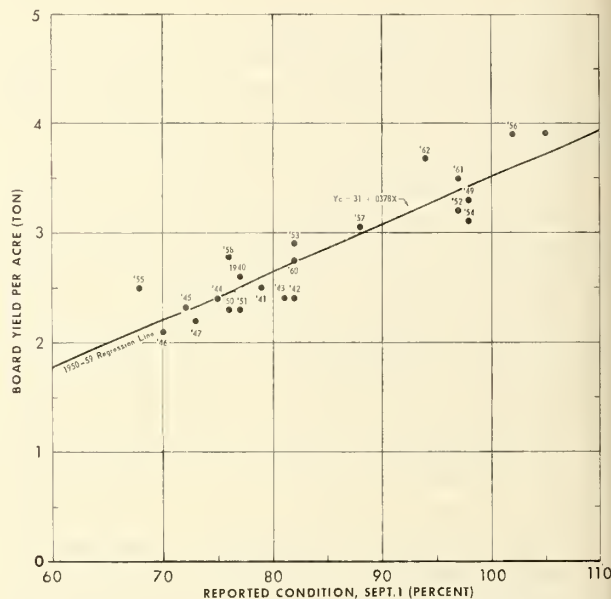


FIGURE 26.—Sweet corn for processing, Wisconsin, yield per acre: Regression of grower reported condition as of September 1 on final yield per acre.

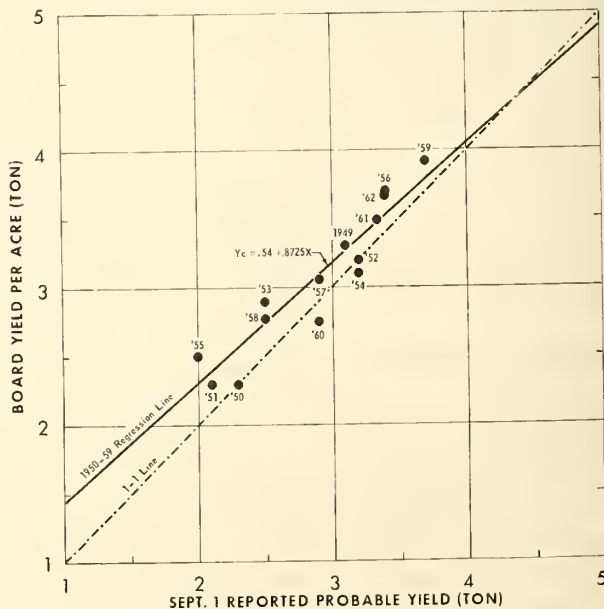


FIGURE 27.—Sweet corn for processing, Wisconsin, yield per acre: Regression of grower reported yield on final yield per acre.

the company as a whole from a headquarters office rather than from individual plants. To avoid sending duplicates of survey questionnaires to processors, the field office in the State in which the company headquarters is located obtains data for all States. Thus, survey data must be exchanged between the field offices operating under the decentralized program. Information must also be exchanged between Washington, D. C., and field offices when a firm operates in States falling under both the centralized and decentralized programs.

The vegetable processing industry is highly organized. Most firms belong to one or both of the industry associations—the National Cannery Association and the National Association of Frozen Food Packers. These two organizations work closely with the Statistical Reporting Service, giving much valuable advice and support to the program. Both organizations compile a great deal of statistical data of importance to their respective industries. Their statistical programs, however, complement those of the Statistical Reporting Service. The National Cannery Association concentrates its statistical program on pack and stocks data. The National Association of Frozen Food Packers compiles data on pack of frozen items. Data on pack compiled by the two organizations are used regularly to review Statistical Reporting Service estimates of raw products. Auction market managers, inspection agencies, and State Departments of Agriculture also provide much useful information and check data used in the processing vegetable program.

POTATOES AND SWEETPOTATOES

Statistical reports for potatoes during the 1930's and 1940's, though useful, were found to be inadequate to cope with post-World War II problems of production, adjustment, and orderly marketing. More timely and comprehensive information on supplies was needed. This need was stressed repeatedly by leaders in the potato industry with the result that Congress, in 1956, appropriated additional funds for the Department of Agriculture to expand the work on potato statistics. Estimates for potatoes and sweetpotatoes include all farm production.

Beginning in July 1956, the entire program of potato production forecasts was reorganized so

that the estimates would facilitate the computation of supplies available during the various periods of the year. The calendar year was divided into six potato producing seasons—winter, early spring, late spring, early summer, late summer, and fall. This was necessary because potatoes are grown in all States and are harvested in every month of the year. The six seasons were adopted as the breakdown which corresponds most closely to the pattern of harvesting and marketing. More important, it is the breakdown that is most feasible for showing competition between States and the seasonal flow of potatoes to market. Potatoes, being a semiperishable commodity, cannot be stored for long periods. That part of the crop harvested from January to October is generally moved to market as soon as dug. Most of the fall crop, about two-thirds of the annual production, is placed in storage and is the principal source of marketings from October until May.

The second phase of the expanded program of information is related to reports of stocks of storage potatoes on hand in the 26 fall producing States. In order to complete the running inventory of potato supplies from the fall crop until marketing has been completed, it was considered essential to have information on storage stocks on December 1, January 1, February 1, and March 1. The present program provides for stocks reports on these dates instead of only the January 1 report issued prior to 1956.

The old "merchantable" stocks concept was abandoned and "total" stocks substituted. Total stocks is defined as "production less total disappearance to date." Disappearance to date includes all sales for all purposes, all potatoes eaten or fed on farms where produced, and all losses through shrinkage, decay, dumping, and so on.

Starting with the 1956 crop, data on potato utilization have been estimated and published. These data are useful in studying utilization trends and such significant developments in marketing the crop as the recent trend toward increased use for potato chips. These estimates of utilization are a further breakdown of the disposition estimates on a United States basis. Total sales are broken down into quantities sold for table stock, processing, livestock feed, and

seed. Sales to processors are separated by general class of products, including: chips and shoe-strings; dehydrated; frozen french fries; other frozen products; canned potatoes; other canned products such as hash, stews, and soups; and starch and flour. Estimates of utilization by processors are based on a mail survey of all processors. Reports from nonrespondents are obtained by personal interview or by telephone. For the portion of the crop not sold, the estimates show quantities: (1) used for seed on farms where grown; (2) used in farm household; and (3) fed to livestock or lost through shrinkage and waste. In the utilization report, estimates of the quantity of potatoes fed to livestock are shown separately.

Sweetpotato estimates were started in 1868. Until 1909, the program included acreage, yield, production, and prices on December 1. Estimates of farm disposition and season average prices date from 1909. Monthly forecasts were added to the program in 1912.

Procedures used in making estimates of potatoes and sweetpotatoes are similar to those used for other field crops. In addition, in some potato areas, such as the Baldwin areas of Alabama and in Florida, the record of inshipment of seed po-

tatoes provides a good measure of the year-to-year change in acreage. Acreage changes indicated by crop meter measurements have been reliable in certain areas of heavy concentration such as in Aroostook County, Maine, and in North Dakota. In other areas, a complete or almost complete enumeration is made, with particularly heavy emphasis on the inclusion of all large farms in the tabulation. Rail and truck shipments or rail and truck unloads at certain terminal markets are used in checking production where recorded movement constitutes a large percentage of production. Inspections and other recorded movement along with marketing order information are also used for checking production. In addition to fresh shipments, enumeration of quantities of potatoes processed in Maine, Idaho, and some other States is used to check total estimates. In areas of concentrated production of sweetpotatoes, such as the Eastern Shore of Maryland and Virginia, New Jersey, California, New Mexico, and Louisiana, recorded rail shipment plus truck unloads at terminal markets or inspections provide a reasonably satisfactory basis for checking estimates of production. Outside of these areas, however, such check data cover a relatively small part of the crop.

CHAPTER 5. FRUITS, NUTS, HORTICULTURAL SPECIALTIES, AND HOPS*

SCOPE

The Crop Reporting Board currently estimates production for 16 noncitrus fruits, 6 citrus fruits, 5 tree nuts, and 7 bush berries. The estimates for many of the fruit crops are shown separately by important types or varieties. In 6 selected States, annual estimates are made of production, sales, and intentions for 4 cut flowers and production, sales, and January 1 inventories for 8 nursery products. The program also includes acreage, yield, and production estimates for hops and estimates of the stocks of hops on hand as of March 1 and September 1 each year.

In general when fruit and nut crops have reached a stage of development where prospective production can be judged, forecasts of production are started and are published each month until the crop has been harvested. Estimates of production, economic abandonment, season average price, and value are published in December (except for persimmons and pomegranates). At the end of the marketing season, estimates are made of farm disposition, utilization of sales, price, and value for all fruit and nut crops.

These disposition and utilization estimates are published in a series of four bulletins, as follows: (1) Early season noncitrus fruits, "Fruits, Noncitrus—Production, Use, and Value, by States" Part I, in early May; (2) late season noncitrus fruits, "Fruits, Noncitrus—Production, Use, and Value, by States" Part II, early July; (3) "Tree Nuts—Production, Use, and Value, by States," early August; and (4) Citrus Fruits—Production, Use, and Value, by States," early October. Except for a few tree nut crops, for which complete marketing data are not available in time the disposition and utilization estimates for the preceding year's crop are published before the first forecast for the new crop. (See table 3.)

For all crops except cut flowers and nursery products the estimates for earlier years are re-

viewed and revised, if necessary, following each quinquennial Census of Agriculture. Annually, when production, farm disposition, and utilization of sales estimates are being prepared, those items for the previous year may be revised if additional check data have become available.

Beginning in 1866 condition reports during the growing season and production reports at the end of harvest, both in terms of percent of a full crop, were obtained from crop reporters for apples, pears, and grapes, but it was not until 1914 that the condition and production percentage reports were interpreted into quantitative production estimates. In 1916 historic data were compiled, and an improved basis for the forecasts was established. In general, estimates have been carried back to 1909, although apples were carried back to 1889 and peaches back to 1899. Estimates and forecasts for other crops have been added as the industry expanded and as demand for such data increased.

The first annual report of utilization estimates for fresh sales and principal processing uses was published in 1944 (for noncitrus fruits), although the data are available for earlier years for various crops. The utilization estimates were undertaken in response to the need by growers, trade organizations, and Government agencies for such data, particularly at the beginning of World War II.

SOURCES OF DATA

Primary data used in preparing estimates and forecasts are collected by State offices primarily from individual farmers (orchardists) and businessmen who cooperate on a voluntary basis. Processors, handlers, and marketing order committeemen are also important sources of information. Primary data are collected by means of

*By George D. Harrell, Earl L. Park, Coyle H. Whitworth, and Lawrence A. Losleben.

TABLE 3.—*Statistical Coverage of Fruit, Nut Crops, Horticultural Specialties, and Hops*

Crop	Acreage			Production	Production by classes by kinds	Stocks	Disposition ²	Prices received by farmers ³	Value of production	Value of sales
	Intentions	Planted	Harvested ¹							
Hops.....	-----	-----	X	X	-----	X ⁶	X	X	X	X
Horticultural specialties: ⁴	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cut flowers.....	-----	-----	-----	X	X	-----	-----	-----	-----	X
Nursery products.....	-----	-----	-----	X	X	-----	-----	-----	-----	X
Noncitrus fruits:	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Apples.....	-----	-----	-----	⁵ X	-----	-----	X	X	X	X
Apricots.....	-----	-----	-----	X	-----	-----	X	X	X	X
Avocados.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Bush berries ⁸	X	-----	X	X	X	-----	X	X	X	-----
Cherries ⁹	-----	-----	-----	X	-----	-----	X	X	X	X
Cranberries.....	-----	-----	X	X	-----	-----	X	X	X	X
Dates.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Figs.....	-----	-----	-----	X	-----	-----	X	X	X	X
Grapes ¹⁰	-----	-----	-----	X	-----	-----	X	X	X	X
Nectarines.....	-----	-----	-----	X	-----	-----	X	X	X	X
Olives.....	-----	-----	-----	X	-----	-----	X	X	X	X
Peaches ¹⁰	-----	-----	-----	X	-----	-----	X	X	X	X
Pears ¹¹	-----	-----	-----	X	-----	-----	X	X	X	X
Persimmons.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Plums.....	-----	-----	-----	X	-----	-----	X	X	X	X
Pomegranates.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Prunes.....	-----	-----	-----	X	-----	-----	X	X	X	X
Citrus fruits:	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Grapefruit ¹²	-----	-----	-----	X	-----	-----	X	X	X	X
Lemons.....	-----	-----	-----	X	-----	-----	X	X	X	X
Limes.....	-----	-----	-----	X	-----	-----	X	X	X	X
Oranges ⁹	-----	-----	-----	X	-----	-----	X	X	X	X
Tangelos.....	-----	-----	-----	X	-----	-----	X	X	X	X
Tangerines.....	-----	-----	-----	X	-----	-----	X	X	X	X
Tree nuts:	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Almonds.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Filberts.....	-----	-----	-----	X	-----	-----	X	⁷ X	X	X
Pecans ⁹	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X
Walnuts.....	-----	-----	-----	X	-----	-----	X	X	X	X
Tung nuts.....	-----	-----	-----	X	-----	-----	⁶ X	⁷ X	X	X

¹ Acreages for individual fruit crops other than those indicated are not available; a composite is published in the Annual Crop Summary.

² Includes utilization of sales for fruits and tree nuts.

³ Includes prices by utilization groups.

⁴ California, Colorado, Florida, Illinois, Iowa, and New York.

⁵ Includes separate estimates for 18 important varieties.

⁶ Utilization estimates not available for these items.

⁷ Prices by utilization groups not available.

⁸ Washington and Oregon.

⁹ Includes estimates by varietal groups.

¹⁰ Includes estimates by varietal groups in California.

¹¹ Includes estimates by varietal groups for California, Oregon, and Washington.

¹² Includes estimates by varietal groups for Florida and by areas for California.

mailed questionnaires, enumerative field surveys, objective fruit counts, and general field travel. The two basic sources of data obtained by mail are the monthly Farm Report questionnaire and special fruit inquiries.

Historically, forecasts of production have been based primarily on the reported condition of the crop. However, yield per tree or per acre and percentage change based on reported current/historic production or current/current production

are additional indications considered in arriving at estimates of production.

Questions asking farmers to report the condition or production of fruit and nut crops as a percent of a full crop in their local areas are a part of the regular monthly Farm Report in the States concerned during the appropriate months. In addition to getting such condition or production data from the general farm reporter, most States maintain a list of commercial fruit and nut producers to whom a special inquiry is mailed each month as needed. Basically, the special fruit inquiry asks (using apples as an example) "What is the condition of apples in your locality as a percent of a full crop?" Instructions carried on the questionnaire specify "Please report the condition of fruit crops now, as compared with prospects for a full crop. Let 100 percent represent the full crop you would expect if there were no damage from unfavorable weather, insects, diseases, etc." (For the last inquiry during or just after harvest the questionnaire is reworded to read "Please report production as a percent of a full crop," and the instructions specify "Let 100 percent represent the full crop which would have resulted if there had been no damage from unfavorable weather, insects, diseases, etc.") If there are only half as many apples (or other fruit or nuts) on the trees as would be expected if there were a full crop the respondent should report 50 percent. If he thinks that the trees have three-fourths as much fruit as they would have if there were a full crop he should report 75 percent, and so on. Early in the season the orchardist will also take into account the growth and development of fruit to date, the insect and disease situation, as well as the general vigor or lack of vigor apparent in the trees or vines. He is not expected to reflect change in acreage or tree numbers or changes in total bearing surface of the trees in his percentage condition report. The indications from the special inquiries and from the monthly Farm Report were originally brought together as a "combined" indication. However, as fruit producing farms become more commercialized and specialized, the special fruit inquiry tends to reflect the fruit situation more accurately than reports from general farmers, and greater reliance is placed on it.

The current/historic (C/H) indication is obtained by the use of special fruit inquiries which ask: "For the orchard(s) you now operate: What is your estimate of production this year (1963)? What was your production last year (1962)?" The special fruit inquiry also provides an opportunity to ask for the number of trees of bearing age. This is done in several States, and from such information a yield per tree can be computed to supplement the C/H percentage change in production.

The matching of data reported for the current month this year with that reported in the current (or same) month last year provides the basis for determining a current/current (C/C) percentage change in production or in the number of trees of bearing age. In many States this is the only means of keeping abreast of changes in tree numbers between the quinquennial census enumerations, although a few States have periodic surveys which are in fact a complete inventory of trees in commercial orchards (usually defined as those having 100 or more trees of any one kind of fruit). In California, annual estimates of tree numbers are based on a complete enumeration of about one fourth of the counties and estimates by the County Agricultural Commissioners in the remaining counties.

Replies from the monthly Farm Report and from the special fruit inquiry on condition are summarized by counties or groups of counties (crop reporting districts) and weighted. Weights for each area are based on the revised production for the most recent census year divided by the growers' reported "percent full crop." This derived "100 percent equivalent" of what a full crop would be shows the relative importance of each area and provides a means of combining condition indications for each county or district into a representative State average. Other appropriate weights are used for other indications.

INDICATIONS USED FOR ESTIMATES

Condition

The information on condition obtained from the mailed questionnaires is correlated with production. Plotting such data provides a graphic portrayal of the relation between reported condition and production and lends itself to a quick

interpretation of new survey data into a forecast. Graphic correlation, with condition and time the independent variables, and production the dependent variable, is a basic tool in the forecasting of fruit production. For each month and for each crop, the reported condition is plotted against final production, a regression formula is computed, and the regression line is drawn on the chart. Usually the regression formula is recomputed each 5 years on the basis of revised data for the two most recent census periods. Regression formulas in use in 1963 were based on data for the years 1949 through 1959. By use of the regression formula and the reported condition, a regression indication of production is computed for each year (or it may be read from the regression line on the chart).

Final production usually is different from production calculated by use of the regression formula, and the differences between the two in recent years become the basis for determining trend. Although departures can be expressed in terms of actual units of production, in the fruit estimating program the Board has used ratios (percentages)—actual production divided by production computed from the regression formula. The departures (ratios) are then plotted on a time series chart. The ratio approach provides a time and production relation of multiplication rather than the relation of addition which would result if departures were expressed in terms of actual units of production.

To adjust for trend the computation of production from the regression equation is multiplied by the projected trend ratio (expected departure from the regression line). Trend is assumed to reflect the changes in production which result from changes in numbers of trees, changes in bearing surface of the trees, and changes in cultural methods. As an aid in visualizing the relation between production trend and tree numbers, the number (or acres) of bearing trees is plotted against time on the same chart with the trend ratios. Although most of the difference between actual production and regression-line estimates is considered to be trend, it is recognized that sample fluctuation and errors also account for some of the departures. The same regression approach can be and sometimes is used for reported average yield vs. production.

Figures 28 and 29 illustrate the application of the above procedures to estimation of peach production from reported condition. Reported condition as percent of a full crop (X axis) and final production of peaches (Y axis) were plotted for the years 1949 through 1962, and the regression formula ($Y = 165,000 + 19,200X$) was derived. If condition of the new crop is reported at 80 percent of a full crop, the regression formula or the reading from the regression line in figure 28 indicates a crop of 1,701,000 bushels. Figure 29 shows that the ratio of actual production to regression production has established a downward trend, and has followed, to a less pronounced degree, the downward trend in acreage of bearing peach trees which has continued through 1962. Since 1954, the trend line has declined an average of 3 points per year. Taking these relations into consideration it would appear that a trend ratio of 81 percent for the 1963 forecasts is not unreasonable.

If trend were not a factor, a crop of 1,701,000 bushels could be expected; but the trend line shows that actual production has been falling well below that indicated by the regression line. If it is assumed that production will be only 81 percent (trend adjustment) of that indicated by the regression formula (1,701,000), a crop of 1,378,000 bushels is all that would be expected, and in the absence of any other data would be the forecast of production for the particular

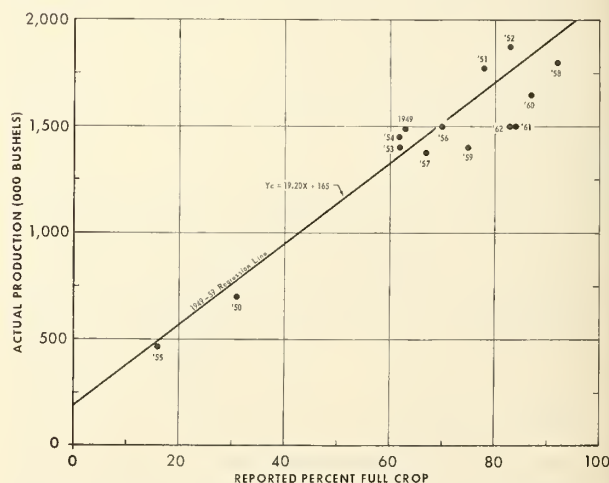


FIGURE 28.—Peaches—September 1 reported percent of a full crop versus actual production. Least-squares regression line based on the 1949-59 period. Virginia.



FIGURE 29.—Peaches—Trend in the acreage of bearing age peach trees, and the ratio of actual production to the indicated production from the regression formula (see regression line in figure 28). Virginia.

month considered. If at the end of the season after all check data have been fully considered, it is found that the actual production comes to only 1,350,000 bushels instead of the 1,378,000 bushels forecast, the trend adjustment (or ratio) becomes 79 percent ($1,350,000 \div 1,701,000$) instead of the 81 percent projected at the time of the forecast. Thus, the interaction of the changes in tree numbers, size of trees, variety yields, cultural practices, and inherent sample bias will have resulted in production falling 21 percent below that which the regression computation of grower-reported data would indicate. This is a somewhat sharper downward adjustment than had been anticipated earlier in the season when the trend adjustment was projected to 81 percent.

Current/Historic Percent

Another indication of production is obtained from special fruit questionnaires which ask growers for estimated production for the current year and for last year's production. The ratio of these two items shows the indicated current/historic percentage change in production between the two years for those orchards in the sample. Actual change may differ from that shown by the sample because growers must rely solely upon their judgment, and therefore may not accurately

appraise the change. Furthermore, replies come from voluntary respondents who may not be representative of all growers in the State.

To appraise the bias in the sample the reported percentage change for each year is plotted (X axis) against actual percentage change (Y axis) as determined at the end of the season on the basis of check data (fig. 30). If the July C/H indication for cherries is reported at 50 percent, we see from the chart that the crop will probably be larger than that. On the other hand, if the C/H is reported at 180 percent, then looking at figure 30, it seems likely that production will be less than 180 percent. In July 1962 the growers reported that production for 1962 was expected to be only 80 percent as large as in 1961. Based on the usual relations as shown in figure 30, the reported 80 percent could be interpreted as indicating that actual production would be approximately 88 percent as large as the preceding year's crop. The preceding year's final production multiplied by 88 percent gave one indication upon which to base the July 1962 forecast.

Yield Per Tree or Acre

A further indication for estimating fruit production is reported yield per tree. The regression approach to interpreting production from reported data as previously discussed for condition is equally applicable to yield and is so used for

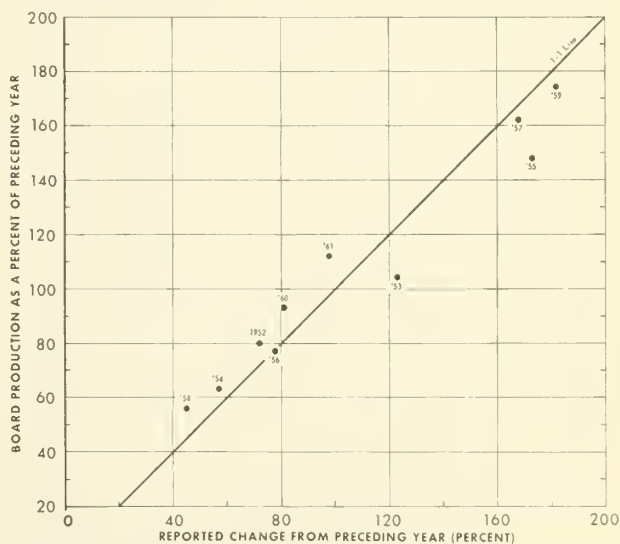


FIGURE 30.—Sour cherries—July 1 reported percentage change in production from the preceding year versus actual percentage change.

several fruit and nut crops. However, to be most effective, the yield indication should be supplemented by survey data which adequately establish tree numbers.

If we assume that growers answering a special apple inquiry report an average yield of 10.5 bushels per tree and the State has an estimated 500,000 apple trees (based on special tree surveys), these two components would indicate a 5,250,000-bushel crop. However, assuming accurate estimates of tree numbers, we can see in figure 31 that the average yield per tree for growers in the sample is much above that for other growers. The sample of voluntary reporters is very selective as reflected in the plotted data. Orchardmen with generally high yields are the ones who have more consistently answered the questionnaires. Correlation of indicated production and actual production points up the fact that an indication of 5,250,000 bushels from this sample very likely will turn out to be only 2,600,000 bushels when check data have been collected. Thus figure 31 shows that even though the yields for the sample orchards are on a much higher level than for other orchards they can be used to adequately reflect the year-to-year change which occurs for all trees.

Objective Counts and Measurements

Forecasting procedures discussed up to this point have been subjective in nature—both in respect to the growers' appraisal of production

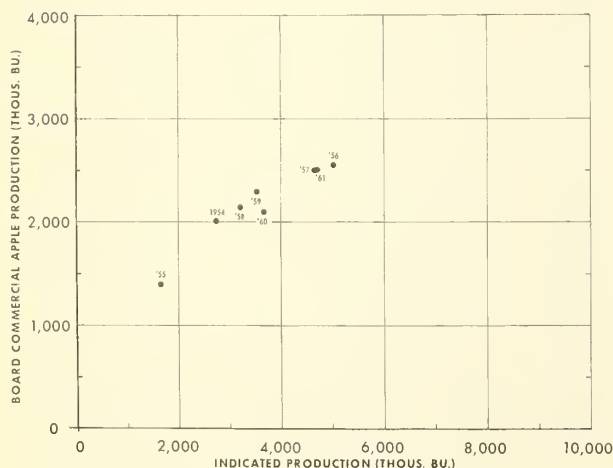


FIGURE 31.—Apples—October 1 indicated production from reported yield \times bearing trees versus Board production. Illinois.

and the statisticians' subsequent interpretations of bias or trend. However, objective methods of estimating production of fruits and nuts are available; these are used only to a limited extent because they are more costly than surveys conducted by mail. The basis for objective estimates is a count of the fruit or nuts on sample trees. Because it is not feasible to count all of the fruit on a tree, a count is made on only part of the tree, generally one or more limbs. From a randomly selected sample of trees, in which age and varietal distribution are proportionately represented, sample limbs (or branches) are chosen randomly.¹

The limbs are selected randomly after probabilities are assigned to the limbs or branches on the basis of their cross-sectional areas. Studies have been made which indicate that the bearing surface of a limb has about the same relation to the total bearing surface of the tree as the cross-sectional area of that limb has to the sum of the cross-sectional area of all limbs on the tree.²

To illustrate the application of objective counts to the program of estimates let us assume that preliminary studies indicate that a 10-percent sample of the bearing surface of the sample tree(s) is needed for the desired degree of accuracy. The primary limbs on a sample tree are measured for cross-sectional area and a sample limb is selected. If the sample limb is too large (well over 10 percent of the total cross-sectional area of all the primary limbs), additional measurements are made, progressing through the successive subdivisions on the sample limb by random selective procedures, until a branch is located that has a cross-sectional area which approximates 10 percent of the sum of the cross-sectional areas of all primary limbs. The fruit or nuts on this branch are counted. This count is expanded to a total for the tree based on the reciprocal of the probability of selection. If the count showed 420 fruit on the branch, and the probability with which the sample was drawn was 13/120 or 0.108,

¹ Jessen, R. J. Determining the Fruit Count on a Tree by Randomized Branch Sampling. *Biometrics*, Vol. II No. 1, March 1955, pp. 99-109.

² Kelly, B. W. Objective Methods for Forecasting Florida Citrus Production. *Estadística*, Jour. Inter-Amer. Statis. Inst., March 1958.

then the reciprocal of this probability would be 9.26 and the count of fruit on the limb expands to 3,889 (420 times 9.26) as the number of fruit for the entire tree. Based on similar counts for all trees in the sample, the fruit per tree in this example averages 4,253. A year earlier at a comparable date (or stage of development) the sample trees had an assumed average of 3,974 fruit per tree. From the ratio of these two counts (4,253/3,974), which derives to 107 percent, a 1963 crop 7 percent greater than in 1962 would be expected. However, size of fruit, rates of growth, droppage of fruit, and tree numbers are also measurable factors which will affect the actual production in 1963 and must be taken into account.

Currently, objective programs take into account size of fruit (or nuts) by measuring either circumference or diameter of the fruit, or by weighing a sample of fruit. For example, if fruit counts of apples were made in September, a subsample of fruit would have been selected and weighed. If the sample fruit from the 1963 crop averaged 7.3 ounces and the sample fruit in 1962 averaged 7.8 ounces, the 1963 fruit would be only 94 percent as large (weight basis) as the 1962 fruit.

Tree numbers must also be considered in utilizing objective counts and measurements. Although tree numbers are sometimes determined by a complete enumeration, they usually are based on a sample of orchards or groves. For the example cited here, if bearing trees totaled 500,000 in 1963 and 520,000 in 1962, then the fruit count and measurement data could be applied to only 96 percent as many trees as the year before.

Tying together the factors which have been considered objectively—fruit per tree and size of fruit, along with tree numbers we find that the ratio estimator indicates that the 1963 crop was only 97 percent as large as the 1962 crop (107 percent \times 94 percent \times 96 percent). On the basis of a 1962 crop of 2,300,000 bushels, the above indications would support a forecast of 2,208,000 bushels for 1963; if a count of fruit were the only indication of production, the forecast would have been 2,461,000 bushels.

Additional refinements of objective measurements can be achieved by adjusting for fruit droppage and for growth of fruit between the

time counts are made and harvest. Sample studies of rates of growth and of fruit droppage throughout the season, made over a period of years, give the basis for projecting the number and size of fruit that can be expected at harvest-time. Determinations of droppage and rates of growth are made each month, providing a basis for adjustment of earlier forecasts to allow for a change from those growing conditions projected earlier.

The ratio estimator is not the only indication which can be derived from objective data. States which have a reliable estimate of bearing tree numbers are in a position to make a direct expansion from such data, using fruit per tree, weight per fruit, and the number of trees to obtain an indication of total production. However, the ratio estimator has generally proved to be a more satisfactory working tool.

Another objective approach to determining the size of crop is the frame count. This was originally used by growers' administrative committees for California and Arizona oranges and has a lengthy history of use in Florida dating back to the 1930's. In making this type of count, groves and trees were chosen by a predetermined sampling scheme. Then for each sample tree selected the number of fruit within the limits of parallel lines of a given "picture" frame (2 ft. \times 2 ft.) from the outside of the tree to the trunk were counted, with the frame placed against the tree about 5 feet above the ground. In addition, the size of individual fruit in a sample was measured with calipers. From the number of fruit per frame and the size of fruit as determined by the average diameter per fruit, the year-to-year changes in fruit per frame were computed and used as indications of the change in size of crop.

To take into account changes in bearing surface of the individual trees and to more accurately obtain a proportionate count of fruit within a given area of the tree, Florida has adopted a modification of the standard frame and the method of using it. A "pie shaped" frame³ enables the enumerator to count fruit from the frame triangularly to the trunk of the tree instead of on the basis of a parallelogram all the way to the trunk.

³ Stout, Roy G. Estimating Citrus Production by Use of Frame Count Survey. Fla. Agr. Expt. Sta. Jour. Series, 1962.

This is accomplished by adjustable "side blinders" which can be pointed towards the center of the tree. By sighting along these extended sides (blinders) to the center of the tree, the number of fruit within the pie-shaped area can be determined. The fruit count within the frame must then be related to that of the total bearing surface of the tree. The method of doing this is explained below.

The bearing surface of a tree approximates the surface area of a paraboloid; thus, bearing surface can be computed from height and radius measurements of the tree. Pie-shaped frame counts are made at randomly selected heights from the four quadrants of the tree instead of the 5-foot height used with the old frame. To estimate the fruit per tree, the total bearing surface in square feet is divided by 4 (the square feet in the 2' \times 2' frame) and multiplied by the average number of fruit counted per frame as determined by the four frame counts per tree.

In all of the objective counts or measurements it is necessary to have some point of reference in time, such as a date or stage of development, in order to project number and size of fruit at harvesttime.

Production Checks

Records of rail and truck movement, traffic association data, data from marketing order administrative committees, and reports by processors on receipts of fruit for canning, freezing, drying, and other uses enable the Crop Reporting Board to check the actual production and disposition of the more important fruits. Such checks are feasible only when a large part of the State's crop moves through marketing channels on which records are available or when the crop is under a marketing order. These data, as they become available, provide the basis for revisions published in the December Annual Crop Summary and for estimating utilization at the end of the marketing season.

In some States, for some crops, only a small fraction of a crop is processed and not enough of it is accounted for by recorded rail or truck movement to provide a reliable annual check on production. For such crops the only reliable check on production is the quinquennial Census of Agriculture. Each 5 years, the production estimates

are reviewed in the light of the census enumeration as well as all other available check data and are revised if necessary.

CROPS ESTIMATED

Noncitrus Fruits

Monthly production forecasts for the following noncitrus crops are published during the growing season: Apples (commercial areas only), apricots, Florida avocados, Washington and Oregon bush berries, sour cherries, sweet cherries, cranberries, grapes, California nectarines, peaches, pears, plums, and prunes. The forecasts start in May for the southern peach States, and continue for various crops through November 1. Only annual estimates of production are made for California avocados, dates, figs, and olives. These are published at the end of the year in the December Annual Summary along with the year end estimates for the 13 crops listed above for which monthly forecasts are made. Estimates of economic abandonment (unharvested production and excess cullage of harvested fruit) are also published in the December Annual Summary. The season average price and value are published in December in Crop Values for all of these crops. After the marketing season has ended, estimates of production, farm disposition, utilization of sales, season average price, and value are published in a series of two bulletins. The first of these, published in early May, contains these statistics for apricots, sour cherries, sweet cherries, peaches, pears, grapes, nectarines, plums, prunes, persimmons, pomegranates, and bush berries. The second bulletin published in early July, contains similar statistics for apples, avocados, cranberries, dates, and olives.

Condition or production data in terms of percent of a full crop were first obtained from crop reporters in 1866 during the months of June through November for apples, peaches, pears, and grapes in all States. The first quantitative forecast of apple production was made in August 1914. Peach and pear forecasts were added to the program in 1915. The first forecast of grapes was made in 1925, and by December 1925 estimates of production had been initiated for 8 additional fruit crops.

During the late twenties monthly forecasts of production were begun for apricots, plums, and

prunes, and in the early thirties cherry production forecasts were started, with estimates worked back to 1919. Cranberry forecasts for Massachusetts, New Jersey, and Wisconsin started in 1918, with yearly estimates worked back to 1900. Cranberry estimates were begun in 1924 in Washington and Oregon. Annual nectarine estimates were added in 1956, with these estimates worked back to 1936.

The program of forecasts includes not only production of various species of fruit but also variety, type, or area breakdowns for certain fruits. In 1929 separate estimates were begun for clingstone and freestone peaches and for wine, table, and raisin variety grapes, all in California. The production estimates were worked back to 1909 on a yearly basis for each. Beginning in 1939 separate estimates were published for sour cherries and sweet cherries in 12 States, with production for the preceding year also separated into those two categories. Separate estimates for Bartlett pears and for "other" pears in the three Pacific Coast States were also begun in 1939. In 1944, estimates of apple production by varieties by States were initiated with an August forecast which continued through 1948, a postharvest estimate (November or December), and an end-of-season estimate (July of following year). The series was worked back through 1942.

Since 1938, forecasts and estimates of the apple crop have been restricted by law to "commercial" production, which is defined as apples in the commercial apple areas of each State. Data for the years 1934-38 were reworked on this basis. Estimates of "total" production of apples are available for the years 1889 to 1938.

The first annual report of utilization estimates of noncitrus fruits for fresh sale and principal processing uses was published in 1944. Where the availability of data permitted, utilization estimates were worked for earlier years. The apple utilization was worked back to 1909, but the series for other crops are shorter.

Forecasts of production for noncitrus fruits are based primarily on locality condition reports submitted by growers. These reports of condition are translated into an indication of production by the methods described earlier in this chapter under "Condition." C/H percentage change in production and yield per tree or per acre are used to a limited extent in some States and for certain

crops. The use of these additional indications, based on the individual orchard operations, is increasing as production tends to be concentrated in commercial or specialized fruit farms. Objective counts and measurements have not been used extensively for noncitrus fruits. Their use at present is limited to California peaches and grapes and Michigan sour cherries; research studies are underway to determine the feasibility of objective measurements for apples in Virginia and sour cherries in New York, Pennsylvania, and Wisconsin. Objective estimates of California Bartlett pear production were made from 1952 through 1958; but after that time facilities for the objective measurements were no longer available. Research into the use of objective methods of estimating New York apple production by major varieties was undertaken during 1957, 1958 and 1959. Objective counts and measurements, though costly, lend themselves very well to fruit estimates. Up-to-date information on tree numbers is an important key to improved accuracy of production estimates, but at present there is no continuing national program of fruit tree estimates.

Final estimates of noncitrus production and revisions of earlier estimates are based primarily on rail and truck movement, inspections, processors' receipts, marketing agreement data, and Census of Agriculture enumerations.

Citrus Crops

During the growing season monthly forecasts of citrus production are made for oranges, grapefruit, lemons, limes, tangerines, and tangelos. Varietal or type breakdowns are made for oranges into navel, Temple, and other early and midseason varieties, and Valencias. In Florida a separate breakout of Temples is made. Grapefruit estimates in California are broken down into Desert Valleys and "other" areas and in Florida into white seedless, pink seedless, and "other" grapefruit.

Because the harvest of citrus fruit occurs predominantly in the year following the year of bloom, a citrus crop is identified by both year of bloom and year that harvest is completed. Thus the 1962-63 crop refers to fruit from bloom of 1962, some or all of which was harvested in 1963. Oranges and grapefruit bloom mostly in Febru-

ary and March. Harvest begins in late September or early October for the early varieties, becomes heavy during the winter and spring months, and ends by about July 1 for Valencias in Florida. However, in California harvest of Valencias does not become heavy until the summer and early fall months the year following that in which bloom occurred and does not end until about December. Lemons bloom to some extent throughout the year, but heaviest bloom occurs in March and April. Harvest usually commences about mid-September in Arizona and in early November in California. In Arizona, harvest is usually over by early February, but in California it continues through October.

Forecasts of the new crop begin as of October 1 for all citrus crops except California lemons, which begin November 1, and California Valencia oranges and California "other" grapefruit, which begin December 1.

Forecasts or estimates of production continue through the following July. In early October, after most of the crop has been marketed, estimates showing production, farm disposition, utilization of sales, season average price, and value are published for all citrus crops. The October 1962 report covered the 1961-62 crop and also incorporated any additional revisions of the preceding season (1960-61), mostly for California's lemons, Valencia oranges, and "other" grapefruit which were still being marketed when the first estimates of disposition were made in October 1961. As with noncitrus fruits, revisions for a crop are made before the first forecast of the new season.

Forecasts of production are based on growers' reports of local condition which are interpreted graphically from the regression formula and adjusted for trend as described under "Condition" earlier in this chapter. Grower C/H percent change, packer C/H percent change, and administrative committee data are also sources of indicated production. To an increasing extent reliance is being placed on objective fruit count and measurement data as an indication of production. In Florida, objective limb count, fruit droppage, and growth measurements are made for oranges and grapefruit, and the modified (pie-shaped) frame count of fruit is made for tangerines, Temple oranges, and tangelos. These

objective data are adjusted for droppage and size growth as determined by sub-sample counts and measurements.

Final estimates of production and utilization or revisions of earlier citrus estimates are based primarily on marketing order administrative committee data, supplemented by data on shipments and local sales and information from processors.

Tree Nuts

Forecasts of production for almonds commence in May, for filberts and walnuts in July, and for pecans in August. In the December Annual Summary, production estimates are published for these four edible tree nuts and also for tung nuts, which are produced for their oil. Economic abandonment, season average price, and value for these crops are also published in December. The following August, estimates of farm disposition, utilization of sales, season average price, and value are published.

Indications of nut production are obtained from growers by mailed surveys—both the monthly Farm Report and special inquiries to a comprehensive list of nut growers. Grower organizations, handlers, and shellers or processors are other important sources of production data. Objective limb counts are also utilized.

Methods used in estimating tree nut production are essentially the same as those already described for estimating fruit crops: the regression approach with condition plotted against production, and yield against production; the reported current/historical percentage change in production plotted against Board percentage change; and objective sample survey indications obtained from limb counts of nuts together with size (or weight) measurements. The objective approach is used for California walnuts and almonds, Oregon and Washington filberts combined, and New Mexico pecans, and is carried out through the application of the methods described earlier in this chapter. The end-of-season estimates of production are based primarily on receipts of nuts by shellers, handlers, and processors, together with the indication of quantities used on farms as reported by growers. Where marketing orders are in effect, actual quantities handled are generally available and are used as a basis for the final estimate.

Because of the completeness of the check data, further revisions are seldom required the following year or at the time of the review after the quinquennial Census of Agriculture.

Horticultural Specialties

The current program of estimates for horticultural crops includes: (1) Production and sales for the current year and intentions for the following year for four cut flowers—carnations, chrysanthemums, gladioli, and roses; and (2) production and sales for the past year and January 1 inventory for 8 nursery products—coniferous evergreens, broad-leaved evergreens, deciduous shade trees, deciduous shrubs, rose plants, deciduous fruit and nut trees, grape vines, and citrus and subtropical fruit trees. The estimates are made in six States (California, Colorado, Iowa, Illinois, New York, and Florida). The data, representing all establishments with sales of \$2,000 or more of all Horticultural Specialties crops, are published in late June.

A limited program of collecting information for these crops from growers was initiated in 1957 covering the 1956 calendar year in five States, selected on the basis of geographic distribution and their importance to the horticultural industry. These States were California, Colorado, Florida, Illinois, and Iowa. This group of States was expanded to include four additional States—New York, Ohio, Oregon, and Texas—for the 1958 and 1959 surveys. An expanded program was undertaken in 1960 in cooperation with the Bureau of the Census for the 1959 Census of Agriculture. No survey was undertaken in 1961 for 1960 operations; however, a program covering the same commodities but limited to six States was resumed on an annual basis in 1962 covering the 1961 calendar year.

Complete lists of growers were developed and are maintained from a variety of sources. For nurseries, up-to-date lists are obtained annually from the State departments of agriculture showing names and addresses of firms licensed and certified to move plant materials in intrastate and interstate commerce. For cut flowers, grower names are obtained regularly from all available related associations, trade publications, and informed people working with the trade. Lists are thoroughly cross-checked to eliminate duplicate

names. When a new name is obtained, a "size of operation" questionnaire is mailed to the grower before the regular production inquiry is sent in order to determine if the specific cut flowers and nursery products included in the program of estimates are grown by him and if so, the size of the grower's operations. This latter information becomes the basis for size group stratifications. All producers of each crop in each State are stratified into seven size groups according to their volume of sales.

Near the end of December a questionnaire is mailed to all known producers of the commodities being estimated, asking for the necessary production, sales, or inventory data. Subsequently, mailed followups and personal contact of the large nonrespondents are employed to obtain reliable coverage of the industry. All nonrespondents in the five largest strata are enumerated through personal contact, while the two incomplete smaller size strata are expanded from the sample data obtained by mail to totals for each stratum. The data for all size groups are then summed to obtain State and commodity totals.

Results of the survey are published in two annual reports released in June following the year of production: (1) Cut Flowers—Production, Sales, and Intentions in 6 Selected States and (2) Nursery Products—Production, Sales, and January Inventory, in 6 Selected States.

Since the survey is largely one of enumeration, little, if any, revision of data is necessary. If any revisions are needed, they are shown in the following year's publication.

Hops

The program of estimates for hops includes production forecasts during the growing season, an estimate of production in December, an estimate of farm disposition in May, and reports on the stocks of hops on hand as of March 1 and September 1 each year. Estimates of acreage and yield and production forecasts are made in July followed by forecasts of yield and production as of August 1, September 1, and October 1. Acreage, yield, and production estimates for the current year's crop (together with any revisions for the preceding year's crop) are published in December in the Annual Summary and season average price and estimated value in Crop Values.

Farm disposition estimates are released each May in "Field and Seed Crops—Production, Farm Use, Sales, and Value." Each 5 years, a further review is made using data from the Census of Agriculture and any other check data which may have become available. If necessary, revisions are made at that time.

Estimates of acreage, yield, production, price, and value date back to 1915. Data on stocks of hops were first collected in 1937 although they did not become a part of the Crop Reporting Board's program of estimates until 1947.

The procedures for estimating production of hops are similar to those for other field crops using reported condition and yield data. Because hops are produced by a limited number of growers, a comprehensive list of names and addresses is maintained. Special monthly inquiries are mailed to these growers. The survey condition data are plotted against production, and reported yield per acre data are plotted against final yield per acre in determining forecasts of production. Acreage estimates are based on reported current/historic percent change plotted against actual percent change. In addition, some States use a practically complete enumeration of acreage obtained from growers and dealers. Close liaison is maintained with buyers or dealers who keep abreast of acreage and production changes for the growers from whom they obtain hops. These sources and inspection records provide the basis for determining final production at the end of the season.

Stocks of hops are based on mailed surveys. Questionnaires sent to growers, dealers, and brewers ask the quantity of hops on hand as of March 1 and as of September 1. Estimates are based on almost complete enumeration obtained by first and second mail requests, wires, and telephone calls. Estimates for any nonrespondent brewers and dealers are based on the changes from the last survey as shown by firms that did report. Stocks are identified by year of growth—

for example, stocks reports issued during 1963 identified hops as being from the 1962 crop, from the 1961 crop, and from the 1960 crop and earlier years.

Bush Berries

Beginning with the 1962 crop season, a program of bush berry forecasts was inaugurated covering black raspberries, red raspberries, blackberries, loganberries, and boysenberries and youngberries in Oregon; and black raspberries, red raspberries, blackberries, blueberries, and currants in Washington. The program consists of an April estimate of acreage for harvest, a forecast of production in mid-June (mid-July for blackberries), and an end-of-season estimate of production, utilization, and value in December.

Indications are obtained from a randomly selected probability sample of growers, stratified into size groups. Indications considered are: percentage change in production based on reported production expected this year vs. production last year; and reported yield per acre. Inquiries are mailed to the sample list of growers, and those who do not return the questionnaire promptly are contacted by enumerators in order to obtain complete coverage of all growers in the sample.

End-of-season estimates are based on growers' reports showing disposition of the crop, and on receipts of berries by processors.

AGE AND VARIETY TREE NUT SURVEYS

In addition to the national program of regular reports, some of the State offices have issued from time to time special reports on fruits and tree nuts, giving information on the number of trees or acreage by age and variety. Many of these special surveys have been made with funds provided under the Agricultural Marketing Act. For the most part these surveys cover all known commercial growers (orchards with 100 or more trees of any one kind of fruit) in the States concerned, although in some instances they are limited to certain counties or areas.

CHAPTER 6. LIVESTOCK*

The livestock estimating program of the Statistical Reporting Service provides statistics on cattle and calves, hogs and pigs, sheep and lambs, and goats—both on the live animals and on the meat, wool, and certain other products of these animals (table 4).

The reports in which these statistics are published may be divided into five main categories, namely: (1) Inventory numbers and value; (2) livestock births; (3) livestock slaughter; (4) meat animals—production, disposition, and income; and (5) miscellaneous livestock reports, which include statistics on cattle, calves, and sheep on feed; shipments of stocker and feeder cattle and sheep; wool and mohair production; and condition of range feed and livestock in western areas.

This comprehensive program has evolved from a small beginning in 1867, when annual estimates of inventory numbers and value were inaugurated. For more than a half century these annual inventories were about the only statistical activities dealing with livestock on farms. About 1908 annual estimates of wool production and of quantities and value of livestock production were started. Between 1910 and 1920 many mail surveys were made to obtain information on a wide range of subjects relating to livestock. Most of these were inquiries in which informed individuals were asked about changes in inventories, production, marketing weights, losses, diseases, and breeding or other management practices in their locality. In 1919 the collection of the total number of animals on individual farms as of January 1 was begun on a limited scale. A year later the reporters were asked to report their number of each species by age and sex.

In 1922 arrangements were made with the Post Office Department for rural mail carriers to distribute questionnaire cards to farmers. For the first few years thereafter the questions on the survey cards concerned only sow farrowings and hogs and pigs on farms. But, as the advantages

of this method of getting adequate individual farm samples became more apparent, other questions regarding livestock were added. Within a few years most of the information as to the number of livestock on farms, size of the pig and lamb crops, and production of wool was obtained from rural carrier livestock surveys twice each year.

By about 1930, the methods of getting information from producers on livestock numbers had become sufficiently standardized to permit editing and tabulation procedures to be established. Cards not usable for any one or more species were eliminated. This method of editing made it possible to compute an average per farm for each species per livestock farm tabulated, and an average per farm reporting each species. Reports from respondents who reported on identical farms for both the current year and previous year were also tabulated. The computed indications of changes from these reports were compared with estimated changes that were based on records of assessments, shipments, census enumerations, and other information used in revising preliminary estimates. Thus, it was possible to chart a series of year-to-year changes. In general, two types of charts were used: (1) line charts, on which all estimates and indications of change are shown on one chart in relation to a base year, and (2) dot or regression charts, on which each survey indication is separately charted against the estimated changes from one year to the next or against the actual estimate of numbers. These types of charts are still used for many of the livestock reports today, although modifications have been made to account for the changes in the number of farms and other factors.

Another of the initial activities in regard to livestock statistics was that of developing meth-

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TABLE 4.—*Statistical Coverage of Livestock*

Item	Number on farms	Breeding intentions	Births	Number raised	Inshipments	Deaths	Production	Disposition	Sales	Prices received by farmers	Value of sales	Slaughter			Value of home consumption	Gross income	Value of production	Stocks (cold storage)	Condition
												Commercial	Federal	Farm					
Livestock and livestock products:																			
Cattle and calves	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X		
By age, sex, and use classes, Jan. 1	X																		
On feed for market, monthly and quarterly	X								X										
On pasture, Blue Stem and Osage	X				X														X
On ranges, monthly	X																		X
Goats	X																		
Goats clipped	X																		
Mohair							X		X	X	X						X		
On hand Jan. 1 (Texas)	X																		
Hogs	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
Total January 1	X																		
By weight classes, Dec. 1	X																		
By weight classes, quarterly	X																		
Lard							X											X	
Meat:																			
Beef							X											X	
Lamb and mutton							X											X	
Pork							X											X	
Veal							X											X	
Sheep and lambs	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X		X
By age and sex classes, Jan. 1	X																		
On feed for market, Nov. 1, Jan. 1, Mar. 1	X																		
On ranges, monthly																			X
Lamb crop, early			X																
Shorn	X																		
Wool, shorn							X		X	X	X						X		
Wool, pulled in pulleries							X												
Ranges																			X

ods for getting adequate information as to the movement of livestock by States, by months. This information was needed for determining both the total and seasonal movements from and into individual States. This information was obtained from various sources, including monthly records of State of origin of receipts from stockyard companies and from direct-buying packers, records of brand inspection, Sanitary Board inspection records, and records of cars of livestock received and forwarded by railroad companies. Over the years

many changes have had to be made in the methods of obtaining these records in order to keep up with the changes in marketing and transportation practices.

Records on movements of livestock make it possible to prepare estimates on production, disposition, and income by States for meat animals—cattle, hogs, and sheep. These estimates have been prepared since 1924. The use of records of movement of livestock will be discussed more fully in the various sections of this chapter.

During World War II the need for additional livestock statistics became apparent. As a result, estimates of total commercial slaughter by States were started in 1946.¹ Quarterly reports of cattle on feed were started in 3 States in 1948; these reports now cover 32 States. In 1954 the number of pig crop reports was increased in 6 States from two a year to four; at present there are 11 States in this quarterly program. In 1956 a mid-year report was added on calves born and cows expected to calve during the year. In 1960 the sheep on feed program was expanded to include three reports a year in seven States.

For most livestock reports the Census of Agriculture taken every 5 years provides an enumeration of livestock on farms and ranches by species, sex, and certain age classes. This enumeration is used as a benchmark in establishing the level of the estimates. The use of the census enumeration as a benchmark will be discussed more fully in the next section of this chapter.

The following sections of this chapter discuss the various livestock reports now being prepared by the Statistical Reporting Service. For most of the estimates more than one survey indication is available on which to base the estimate. In determining the relative weight to give to each indication in arriving at the estimate, the statistician must make full use of his experience, knowledge, and judgment.

INVENTORY NUMBERS ON FARMS AND RANCHES

Numbers and Value: January 1

Estimates are made of livestock on farms and ranches on January 1 for cattle and calves, sheep and lambs, hogs and pigs, and goats. Estimates of horses and mules on hand January 1 were discontinued after 1960. Estimates of each species, except goats, are made for all States; estimates for goats are made for Texas only.

The estimates include the total number of each species broken down into age and sex. For cattle and calves the classes are divided into two main groups: (1) those kept for milk, and (2) all "other." Estimates of cattle and calves kept for milk are further divided into three classes: (1) cows and heifers 2 years old and older, (2) heifers 1 to 2 years old, and (3) heifers under 1 year old. Estimates of "other" are divided into five classes:

(1) cows and heifers 2 years old and older, (2) heifers 1 to 2 years old, (3) steers 1 year old and over, (4) bulls 1 year old and over, and (5) calves under 1 year old.

Sheep and lambs are divided into two groups: (1) sheep and lambs on feed for slaughter market, and (2) stock sheep and lambs. In seven States the number of sheep and lambs on feed are separated into (1) lambs and (2) sheep. In other States only the total on feed is shown. In all States, estimates of stock sheep and lambs are divided into five classes: (1) ewes 1 year old and older, (2) ewe lambs under 1 year old, (3) ram and wether lambs under 1 year old, (4) wethers 1 year old and older, and (5) rams 1 year old and older. For hogs, the January 1 estimate shows only "all hogs." The detailed breakdown is shown for the December estimate as discussed under "Hogs on Farms: December 1."

The general level of the January 1 estimates in each State is based primarily on Census of Agriculture enumerations at 5-year intervals. Year-to-year changes in estimates between censuses are based on indications from mailed samples and from field visits to enumerate sample segments. These indications include the semi-annual livestock and poultry surveys made in cooperation with rural mail carriers, mailed surveys to probability samples, and general purpose enumerative surveys.

Additional check data become available during the year to which the estimates relate. These data are considered at the end of the year, and, if necessary, the first estimate made at the beginning of the year is revised at the end of the year. The estimates of inventory numbers for the previous 5 years are also subject to revision at 5-year intervals in connection with the Census of Agriculture enumeration.

Use of census data

Census data for each State are first reviewed simultaneously with other available information, such as previous census enumerations, State farm census tabulations, and livestock assessment records, to appraise the completeness of the census in terms of number of farms, land in farms, and number of each individual species of livestock.

When the census enumeration is taken at a date other than January 1 allowances need to be

made not only for possible incompleteness but also for changes in livestock numbers between the date of the census and January 1. The 1954 and 1959 censuses were taken in the fall, centering around the middle of November in most States. The procedure for adjusting census data taken in the fall to the following January 1 basis necessarily differs from the adjustment procedure used in earlier years when the census was taken January 1 or April 1. However, the same principles apply.

Two methods are used in converting the census data to a January 1 base. The first is a matched-sample technique from which indications are obtained of the change in inventory numbers on farms between the date of the census enumeration and January 1. For this sample a list of names is drawn from the census questionnaires. Inquiries are mailed to this list, asking for the number of livestock on hand January 1. The returns to the January 1 survey are matched with the census questionnaire for the same farms to obtain an indication of the change in the numbers of each species from the date of the census to January 1. These indicated changes are applied to the census totals to obtain a January 1 equivalent number.

Another method adaptable to meat animals involves making an estimate of the net disappearance or increase between the date of the census enumeration and January 1. This method requires that an average date of the census enumeration be calculated, since the census obtains the number on the place at the time of the enumeration rather than the number on hand as of a fixed date. The net change for each State includes an allowance for births and inshipments, minus marketings, slaughter, and deaths.

For each species the number of births used in adjusting the census enumeration is based on current estimates of animals saved. Inshipments are based on data obtained from two principal sources—records of livestock shipped into a State on health certificates or permits filed with the State veterinarian in compliance with livestock sanitary regulations, and shipments of livestock from stockyards that are inspected by the Animal Disease Eradication Division of the Agricultural Research Service.

Disappearance items which must be estimated for the period are marketings, deaths, and farm

slaughter. Marketings in this sense are animals which are shipped out of the State or slaughtered within the State. Fairly comprehensive and complete records are maintained on livestock marketed each month through principal stockyards, concentration points, and buying stations or through direct sales to packing plants; these records provide a sound basis for estimating the number of animals marketed. Livestock deaths are estimated annually. In recent years farm slaughter has been reported by quarters. (See Appendix A, exhibit 19.) The quarterly percentages can be plotted on Cartesian paper, and smooth curves drawn so that the monthly intersections with the vertical scale equal the quarterly percentage and add to 100 percent for the year. A representative percentage of farm slaughter which occurred after the census was taken can be determined from these individual State charts.

The resulting summation of adjusted census numbers, plus births, and inshipments, minus marketings, deaths, and farm slaughter constitute the January 1 "equivalent" or benchmark for the species. (See fig. 32.)

The January 1 estimate for the census year is then set on the basis of the indicated census number adjusted by the above two methods and the indications from the sample surveys.

Use of survey data

In the years between censuses, the January 1 estimates of inventory and of percent change from the preceding year are based largely on indications obtained from sample surveys, both mailed and enumerative. (See Appendix A, exhibit 20.) The January 1 inventory estimates for cattle and calves in all States and sheep and lambs in 35 States are based primarily on a December questionnaire which is referred to as the rural carrier survey, which is discussed in the next paragraph. Changes from December 1 to January 1 are usually not much different from year to year and constitute no real problem in making the January 1 estimate. For sheep and lambs in the Western States the survey is made as of January 1, since marketings are heavy in the fall and may vary greatly from year to year from December 1 to January 1. (See Appendix A, exhibit 21.) For hogs also, the inventory changes from December 1 to January 1 vary

state WEST VIRGINIA

WEST VIRGINIA

4. Historic Census Data: Data for columns 19-24 inclusive can be copied from the 1950-55 Revision Worksheet. District entries, less than 10,000 should be shown in tenths, i.e., 9,756 should be 9.8.

5. Computations: Two computations for State totals are required. (a) CR and (b) GR. These are (a) that obtained by adding the district figures in columns 32 to 37 inclusive and (b) that computed by using State totals only.

6. Base Year Comparisons: (a) Computations for the American Ratio per farm, Present Base and Statist Revised are based on dividing the respective figures for each year by those for the base year, 1955, as follows: 1956-1957: 1957/1955; 1958-1959, etc., as follows:

(b) The identical C/O and the G/H adjusted for 1954 are computed as follows:

- 1955 = 100
- 1956 = 1956/C as reported
- 1957 = 1957/C x b
- 1958 = 1958/C x c
- 1959 = 1959/C x d
- 1960 = 1960/C x e

(Note: The C/O and G/H indication is from the Previous Decade Rural Calendar; i.e., 1955/C is from 1954-1955 Rural Calendar.)

- 2/ Copy from 950-55 Revision Workbooks.
- 3/ If not assessed January 1, show numbers adjusted to January 1. Basis: add cattle, (excluding calves) started between January 1 and Assessment date.
- 4/ Statist estimates of disappearance for period involved used as basis the Board estimates of balance on January 1. In report of Farm Production and Income from West Animals.
- 5/ Births and Inshipments between date of Census and January 1.
- 6/ Exclude calves born since January 1, 1950.
- 7/ For Equivalent subtract disappearance and add Births and Inshipments to Census.
- 8/ B. C. & Disps. Indications add, to first of year. Deductions are Culls of all cows 2+ and of year to the beginning of year.

1. All computations should be rounded to whole numbers except for classification percentages where tenths are required. (In the few cases where the Board classification percentage is shown in whole numbers, the States concerned should also use whole numbers.)

2. Be sure to show the date of State livestock assessment data, indicating species and classification and noting in comments any changes in data during the past 10-year period, or any change in method of assessing, coverage of species, or assessment rates.

3. The average date of the Special January Survey will have to be based on the receipt of returned questionnaires. The average date of the 1959 Census will be supplied by the Washington office. The average date of the 1959 Census sample should be computed from the Census Livestock tabulation.

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considerably from year to year, since marketings of hogs usually reach a peak in November or December. To arrive at accurate January 1 estimates, December 1 estimates of hogs on farms are made and are adjusted to January 1 by adding births and inshipments and deducting marketings, slaughter, and deaths. (See section on "Hogs on Farms: December 1.")

The rural carrier survey is made as of December 1, with the assistance of the Post Office Department. The questionnaire is in the form of a card which asks for numbers on farm by age, sex, or weight groups. These cards are sent through the postmasters in bulk for distribution by the rural mail carriers. The carriers are instructed to leave the cards in a random distribution to patrons on their route. The cards are collected for forwarding by the postmaster to the State Statistician. Cards distributed to the rural carriers are generally not addressed, but some States address cards to the previous year's respondents in order to increase the number of matched returns. In areas where rural routes are sparse or lacking and where many ranches may have only one species of livestock, supplementary data are obtained from mailed inquiries to lists of known producers.

The sampling rate of the rural carrier survey differs by States, depending on the individual needs of the State for basic livestock information. Where county estimates of livestock populations are made on the basis of information obtained through rural carrier surveys, the State samples are necessarily large in order to provide dependable indications of change by counties and crop reporting districts.

Indications of changes in inventories and in the relation of specific items (such as age, weight, and sex classes) to the total inventory are computed from the tabulations, which are set up to provide totals by crop reporting districts. Summarizing the data by crop reporting districts also facilitates weighting the indications, when this is necessary. Summaries (Appendix A, exhibit 22) are transmitted to the Crop Reporting Board along with the worksheets (exhibit 23). The worksheet provides space for recording indications from the surveys and other sources that are used in the analysis and interpretation of the data and for recording the estimates. Regression

charts are used in both the field and the Washington office to facilitate interpretation of the data. These charts are prepared for each State by plotting the Crop Reporting Board's final estimates for a series of years against the computed sample indications for each of the years. An estimate for a given species can be read directly from the chart, using the indication for the species as computed from the current rural carrier sample.

Enumerative surveys in December covering an area sample provide additional current indications of livestock numbers. These surveys are described in detail in chapter 2. Probability mailed samples are used in some States where complete lists are available for drawing a probability sample.

Survey indications used in estimating the current January 1 inventory number and its percentage change from a year earlier for the various species include (a) "ratio per farm" (or average number per farm) adjusted by the estimated number of farms, (b) the percent change as derived from matched sample (called the "identical" indication), and (c) the C/H (current/historic) percent change obtained by asking producers the number on hand now and a year ago.

The two ratios per farm which can be derived from livestock survey data are the ratio per livestock farm, obtained by dividing the number of head in the sample by the number of returns tabulated, and the ratio per species farm, obtained by using the number of farms reporting the particular species as the divisor. Where weighting by crop reporting districts has resulted in improved efficiency, the weighted rather than the "straight" ratios are used in the adjustments. The ratio per farm adjusted for the change in farms is plotted on a chart against the Board final inventory number for a series of years. The estimate for the current number can be read directly from this chart. (See fig. 33.)

For the matched sample indication current reports from farmers and ranchers are matched against the returns received a year earlier from the same operator for the same farm, and the total current inventory as reported is expressed as a C/C (current/current) percentage of the preceding yearly number. This C/C percentage is the independent variable on the chart shown in

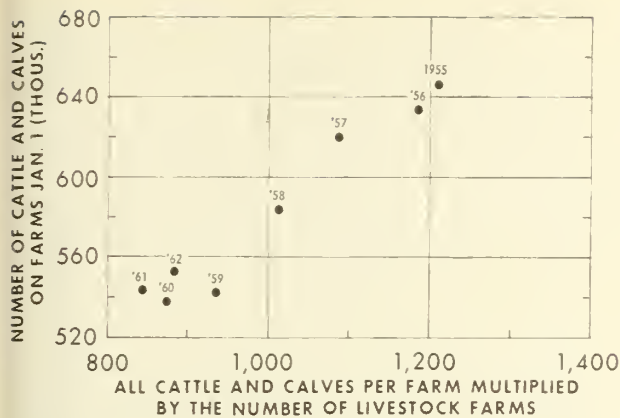


FIGURE 33.—Cattle and calves on farms January 1, South Carolina: Relation of average number reported per farm on rural carrier survey multiplied by estimated number of livestock farms to official estimates of total number January 1.

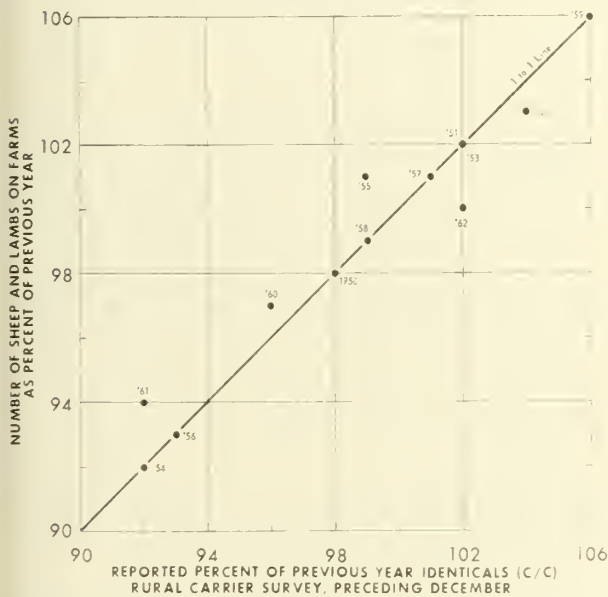


FIGURE 34.—Sheep on farms January 1, Michigan: Official estimates of numbers on farms as percentages of previous year's estimates in relation to percentage relation between number reported on same farm in current year to the number reported in the previous year, on successive rural carrier surveys.

figure 34, while the dependent variable is the Board's percent change in total numbers from the preceding year.

The ratio per farm indication is not consistently reliable in States west of the 100th meridian because of wide differences in the numbers of

cattle and sheep between farms and ranches. Present facilities do not permit use of stratification, enumerations, nonresponse interviews, and other techniques. Therefore, for this western area, the questionnaires are designed to obtain the number of cattle and sheep that were on hand a year earlier as well as the current number on the farm or ranch. The summation of the two series provides an indication of the change in numbers during the year and is referred to as the C/H (current/historic) percent. Experience has revealed memory bias in the reporting of last year's number, and a corrective adjustment is first made in the indication based on relations computed in the matched sample. To illustrate: if the C/H percent for the entire sample is 103 percent, and in the matched sample the C/H percent is 102 while the C/C is 100 percent, the matched returns indicate a 2-percent upward bias in the C/H percentage. Then $103 - 2 = 101$, the adjusted percent. The adjusted C/H percent is plotted on a chart against the Board's final percent change for a series of years. The percent change read from the chart is applied to last year's estimate to arrive at the current number.

Balance sheets

In setting the current inventory numbers for each State for a given species, the indication of the ending inventory from the balance sheet is considered along with the survey data and other data that are available. An indication of the year-end inventory in each State is obtained by adding births and inshipments into the State to the beginning inventory. From this sum, indications of marketings, farm slaughter, and deaths are deducted. The result is the indicated number on hand at the end of the year.

To be most useful for inventory reports, each component of the balance sheet should be estimated on the basis of all available information, and these components should not be forced into balance. Such forcing tends to invalidate the preliminary balance sheet as an indication of numbers.

Consideration is also given to the balance sheet for the United States as a whole which does not involve movement of livestock from one State to another. The major difference between the U.S.

and State balance sheets is that the United States commercial slaughter is used instead of recorded marketings, and imports of live animals from foreign countries are used instead of total inshipments into each individual State. The supply for the year is equal to the beginning inventory, plus births, plus imports. Movements of stocker, feeder, and breeding stock among States are not involved in the U.S. balance sheet, since before slaughter such animals are still on hand at some place in the United States. For State estimates, such animals are counted as marketings for one State and inshipments for another. For the United States, disappearance is the sum of commercial slaughter, exports to other countries, farm slaughter, and deaths. The estimates of commercial slaughter, the major component of disappearance, are entirely independent of farmer reports that are used to estimate inventories, births, deaths, and farm slaughter. Federally inspected slaughter, which makes up four-fifths of the total commercial slaughter, is based on reports compiled by meat inspectors. The nonfederally inspected portion is based on reports from noninspected plants and State inspections. (In theory, the supply minus disappearance equals the ending inventory.) In actual practice the U. S. data are not forced into a perfect balance, but adjustments are often made in the component series to minimize discrepancies.

Estimates of the individual classes of livestock making up the total inventory for each species are based on the percentages by classes reported in the sample. (See Appendix A, exhibit 22.)

Revisions

The January 1 estimates of inventory numbers are subject to revision a year later and at the end of the 5-year census period. Revisions the following year are based on records of livestock assessed, marketings, and other check data that may have become available since the original estimate was made.

Records of livestock assessed for taxation form an important check on estimates of inventory numbers. Experience shows that these records often provide reliable indications of the year-to-year changes in numbers. If assessment records relate to January 1 a direct comparison with the

estimate is possible. When assessments do not relate to January 1, adjustments are made by using records of disappearance between January 1 and the date of the assessment.

Some States having an annual State farm census obtain certain livestock data in addition to that assessed for taxation. These data are considered to be dependable indications of change, though livestock are consistently underenumerated. Only a few questions on livestock can be included in a State farm census. As the assessor is the enumerator for the State farm census, information on numbers and kinds of livestock eligible for assessment is likely to be less complete than on items not eligible for taxation. The assessment or State census data usually are not available at the time the first inventory estimate is made. It takes at least 6 months, and sometimes a year, for the State census records to be assembled in the form needed for checking the inventory estimate.

Value of livestock on hand January 1

Estimates of the value of livestock on farms and ranches on January 1 are made for all species for which inventory numbers are made.

The value of each species is obtained by making an estimated value per head of each class. This value per head is then multiplied by the number of head in that class. The sum of the total values for each class is the total value for that species.

Values per head are based on reports from farmers and ranchers on the value per head of animals in their locality as of January 1.

Hogs on Farms: December 1

Inventory estimates of hogs and pigs on farms and ranches are made as of December 1 in all States. The level of estimates of hogs on December 1, like the January 1 estimates, is based primarily on Census of Agriculture enumerations. Year-to-year changes in estimates between censuses are based on indications from mailed samples and from field visits to enumerate sample segments. For further discussion of the indications and procedures used for making December 1 estimates see the earlier section under January 1

numbers and value on survey indications for all species.

The December 1 estimate of all hogs is divided into two main classes: (1) hogs and pigs kept or to be kept for breeding, and (2) "all other hogs." This latter class is divided into five weight groups: (1) under 60 pounds, (2) 60 to 119 pounds, (3) 120 to 179 pounds, (4) 180 to 219 pounds, and (5) 220 pounds and over.

Revisions

The December 1 inventory estimates of hogs are subject to revision a year later and at the end of the 5-year census period. Revisions the following year are based on records of livestock assessed, marketings, and other check data that may have become available since the original estimate was made.

Quarterly Inventory Estimates of Hogs

Quarterly estimates of hogs and pigs on farms and ranches are made in selected States as of March 1, June 1, September 1, and December 1. At present, quarterly estimates are made in 11 States. Estimates are made for total numbers and for the same classes and weight groups as the December 1 estimates in all States.

The main basis for these estimates is the mailed inquiry to a probability list of either all farms or livestock farms. In most States the sample is drawn from the State farm census listings. States that do not have a State farm census draw a sample from other known lists. The random probability sample drawn from these listings is rotated by replacing a third or half each year. This avoids a buildup in selectivity or response bias which may occur where a fixed list is used repeatedly.

In States where the sample is drawn from a list of livestock farms, a small sample is drawn of nonlivestock farms in order to obtain a measure of "inners"—those just starting livestock operations.

The basic indications used in making the quarterly estimates of number on hand are as follows: (a) average per farm times number of all farms or number of livestock farms, (b) identical current/current percent of previous year, (c) identical current/current percent of the preceding quarter, and (d) direct expansion.

The quarterly estimates of the number of hogs on hand must tie in with births, slaughter, other marketings, and deaths for the previous 3-month period. To check on this a quarterly balance sheet is worked for each State as follows: Births and inshipments are added to the inventory number for the preceding quarter. From this sum, indications of marketings, slaughter, and deaths are deducted. The result is the indicated number on hand at the beginning of the current quarter.

Revisions

The quarterly estimates are subject to revision on the succeeding quarterly date and again on December 1. They are also subject to revision at the end of each 5-year census period. Revisions are based on data that may have become available since the original estimate was made.

LIVESTOCK BIRTHS

Pig Crops

Since 1924 estimates of sows farrowing, pigs saved, and breeding intentions have been made in June and December in all States. Since 1954 supplemental estimates of sows farrowed and breeding intentions have been made in March and September in selected Corn Belt States. In addition to these estimates on sow farrowings, estimates are made on inventory numbers on hand at the beginning of each quarter. (See preceding section on quarterly hog inventories.) At present, the pig crop program is on a quarterly basis in 11 States and on a semiannual basis in the other 39 States.

The general level of the estimates of sows farrowing in each State is based primarily on enumerations by the Census of Agriculture. Year-to-year changes in estimates between census enumerations are based on sample indications from the semiannual livestock surveys made in cooperation with rural mail carriers, probability mailed sample surveys, and general-purpose enumerative surveys.

Since the census enumeration of sows farrowed relates to a period of time rather than a specified date, no adjustments in the census enumeration except for incompleteness are necessary. Because the 1954 and 1959 censuses were taken in the fall, it was possible to enumerate sows that

farrowed from December through May and those that farrowed from June through November.

Semiannual estimates

In the 39 States in the semiannual program the yearly estimate of sows farrowing is divided into two periods: (1) December through May, and (2) June through November. Monthly estimates of sows farrowing are made by States.

The pig crop for each period is obtained by multiplying the number of sows farrowed times an estimated number of pigs per litter.

In estimating the December-May pig crop the first step is to estimate the number of sows farrowing during the period. The first estimate, which is made in December at the beginning of the period, is an estimate of the number of sows that have been bred or will be bred for farrowing during December through May. Three major indications from the December rural carrier survey are used: (1) ratio of sows to farrow per livestock farm multiplied by the estimated number of livestock farms, (2) ratio of sows to farrow per hog farm multiplied by the estimated number of hog farms, and (3) percent change as shown by the identical matched sample. These indications are evaluated on regression charts similar to those used in making estimates of inventory numbers. In evaluating the indications on intentions, consideration must be given to departures from intentions that occurred during the previous period. The number of sows intended to farrow this year are matched with intentions to farrow on last year's card. Consideration is also given to the indications from the December enumerative survey.

The first estimate of the actual number of sows that farrowed during December-May is made in June. Three major indications from the June rural carrier survey are used: (1) ratio of sows farrowing per livestock farm multiplied by the estimated number of livestock farms, (2) ratio of sows farrowing per hog farm multiplied by the estimated number of hog farms, and (3) percent change as shown by the identical matched sample. These indications are also evaluated on regression charts. Consideration is also given to the indications from the June enumerative survey.

The December to May pig crop is defined as the number of pigs from farrowings during the period that are living at the end of the period or were sold or slaughtered during the December-May period. The number of pigs reported on the survey divided by the comparable number of sows which farrowed indicates the average number of pigs per litter for the 6-month period. The policy in estimating the number of pigs per litter is to adopt the reported pigs per litter from the June rural carrier survey unless it appears out of line with previous years and surrounding States. In that case, an estimate is adopted based on the historic pattern with consideration given to surrounding areas. The December to May pig crop is obtained by multiplying the estimated number of sows farrowing during the period by the adopted number of pigs per litter.

Estimates are made of monthly percentages of sows farrowing from December through May. These are based on the percentage by months as reported in the June rural carrier survey unless some month or months appear out of line, in which case an adjustment is made. The percent of sows farrowing by months is carried to one decimal place. This estimated percent of sows farrowing by months is applied to the estimated number of December-May sows to obtain the monthly estimate of sows farrowing during this period.

In making estimates on the number of sows bred and to be bred for farrowing during the June-November period the same general procedure used in making the estimates of the number of sows farrowed during the December-May period is followed. The estimate of the number of sows bred and to be bred for farrowing June through November is based on the June rural carrier survey, and the estimate of actual farrowings is based on the December survey. Additional indications used for estimating the June-November sows farrowing are the ratios obtained by dividing the individual estimators in the December rural carrier survey by the corresponding estimators from the June survey. A similar ratio is calculated from the January 1 disposition survey.

The procedure for estimating the pig crop for June 1 through November 30 is the same as that used in the December-May period.

Quarterly estimates

In the 11 States in the quarterly pig crop program estimates are made for the previous quarter for the number of sows farrowing, number of pigs per litter, and the total pig crop. The number of sows farrowing in the previous quarter is shown by months. Estimates of farrowing intentions for the following 6-month period are broken down into two quarters, with monthly intentions for the first quarter. These 11 States normally account for approximately 75 percent of the pigs raised. The quarter-to-quarter and year-to-year changes are based on a probability mailed sample as of March 1, June 1, September 1, and December 1. (See preceding section on quarterly inventory.)

In arriving at an estimate of sows farrowing from December to February, the following indications are used from the March 1 probability mailed survey: (1) Ratio of sows farrowing per livestock farm multiplied by the estimated number of livestock farms; (2) adjusted ratio of sows farrowing per hog farm multiplied by estimated number of hog farms; (3) identical percent of previous quarter times Board estimate of farrowings during the previous quarter; (4) identical percent of previous year; and (5) a direct expansion of the survey data. Similar indications are developed for making estimates of farrowing intentions for the March-May period and June-August period. The estimate of sows farrowing by months for the previous quarter and intended farrowings by months for the next quarter are based on survey percents reported for each month, with adjustments being made when necessary. Similar procedures are used for the June 1, September 1, and December 1 estimates of sows farrowing and intentions to farrow.

The quarterly pig crop is defined as the number of pigs from farrowings during the quarter that are still on hand at the end of the quarter or were sold or slaughtered during the quarter. The number of pigs reported on the survey divided by the comparable number of sows which farrowed indicates the average number of pigs per litter for the quarter. The policy in estimating the number of pigs per litter is to adopt the reported pigs per litter from the survey unless it appears out of line with previous years and surrounding States. In that case, an estimate is

adopted based on the historic pattern with consideration given to surrounding areas. The pig crop is obtained by multiplying the estimated number of sows farrowing during the quarter by the adopted number of pigs per litter.

Revisions

Revisions of the pig crops are based on assessors' enumerations, marketings, and other check data which may have become available since the original estimate was made. Revisions of the December-May pig crop may be made the following December and again the following June, and the June-November pig crop may be revised the following June and again the following December. To be most useful, revisions are made as soon as possible, preferably before the marketing season is over. In using market receipts as check data, consideration is given to the fact that marketings are earlier in some years than in others. Also hogs may be marketed at an earlier age in some areas of the country. Changes in the proportion of sows marketed from year to year are also considered.

In the quarterly States, revisions can also be made the following quarter if necessary to tie the pig crops and inventory numbers together in the balance sheet approach.

Calf Crop

Before 1955, estimates of calves born were prepared as a part of the yearly report on production and income for meat animals. Beginning in 1955, a separate report on calves born was issued shortly after the January 1 inventory numbers were released. Also, starting in 1956, a report was issued at midyear giving estimates of calves born and to be born during the year. The number of calves born is shown as a percentage of the inventory estimates of cows and heifers 2 years old and over at the beginning of the year. This percentage is not strictly a calving rate as it does not represent the number of calves born as a percent of cows and heifers giving birth to calves during the year.

Midyear estimates

The midyear estimates are based on the rural carrier survey and the June enumerative survey. On these surveys, livestock producers are asked

to report the number of cows and heifers 2 years old and over at the time of the survey, the number of calves born since January 1, and the number of cows expected to calve before the end of the year. The reported data are summarized for each State by crop reporting districts. From the June rural carrier survey the calf crop percentage is computed by dividing the number of calves born and to be born by the number of cows and heifers 2 years old and over on June 1.

The number of cows on hand June 1 is asked instead of the number on hand January 1 in order to avoid memory bias. Since the estimated number of calves born and to be born is shown as a percentage of the cows and heifers 2 years old and over at the beginning of the year, it is necessary to adjust the June information to relate to January 1.

The first step in adjusting the June data is to adopt an estimate of cows 2 years old and older for June 1 and compute the percentage change from January 1. Calves born and to be born as a percent of June 1 cows is then multiplied by the percentage change in cows 2 years old and over from January 1 to June 1. This adjusts the percentage for calves born and to be born as a percent of January 1 cows and heifers 2 years old and over.

Regression charts are prepared by plotting the adjusted percentages for a series of years as the independent variable against the official estimate of the calf crop expressed as a percent of January 1 cows and heifers 2 years old and over. The estimated percentage for the current year is then read directly from these charts.

Another indication of calves born is the matching of reports received from the same respondents for the current year and the preceding year. These matched identical reports indicate year-to-year percent changes in numbers and are plotted as the independent variable against the official estimate of the percentage change in the calf crop for the corresponding years.

Direct expanded totals as well as ratio estimates are available from the June enumerative surveys for the number of calves born and to be born during the year as well as for cows 2 years old and over as of June 1. These estimates are considered simultaneously with the mail survey indications. Since the enumerative surveys are

designed on a probability basis, the sampling error and relative efficiency are known.

Yearend estimates

The estimates made at the end of the year are based on the December rural carrier survey, January 1 livestock disposition survey, and the December enumerative survey. Livestock producers are asked to report on each survey the number of calves born during the year and the number of cows and heifers 2 years old and over at the time of the survey. The reported data are summarized in the same way as the June surveys.

The calf crop percentage for the year is computed from the December rural carrier survey by dividing the number of calves born during the year by the number of cows and heifers 2 years old and over at the end of the year. For those States conducting the January 1 livestock disposition survey, a similar percentage is computed.

Producers are asked to report the number of cows on hand at the time the survey is conducted, which is near the end of the year instead of at the beginning. This is done in order to avoid memory bias which would result if producers were asked to recall numbers on hand a year earlier. Since the estimate of calves born during the year is shown as a percentage of cows and heifers 2 years old and over at the beginning of the year, the December information must be adjusted to relate to the preceding January 1 numbers. This adjustment is made by adopting an estimate of cows 2 years old and over at the end of the year and computing the percentage change from the beginning of the year. The percentage derived by dividing calves born during the year by cows on hand at the end of the year is multiplied by the percentage change in cows 2 years old and over from January 1 to the end of the year. This procedure adjusts the percentage for calves born during the year as a percent of cows and heifers 2 years old and over January 1.

Regression charts are prepared, using the adjusted percentage from the survey as the independent variable. These percentages are plotted against the official estimate of the calf crop expressed as a percent of January 1 cows and heifers 2 years old and over, and the indicated calf crop percentage for the current year is read from these charts.

The December enumerative survey provides direct expanded totals and June-December ratio estimates for calves born since June 1 and cows and heifers 2 years old and over at the end of the year. The enumerative survey estimates from the June and December surveys are considered simultaneously with the indications from the rural carrier and livestock disposition mail survey.

Revisions

Calf crop revisions for the preceding year may be based either on data supporting a change in calf numbers or as a result of revisions in the January 1 number of cows and heifers 2 years old and older. Individual State assessments of livestock provide a measure of relative change in number from year to year. These data and the annual State farm census conducted in several important livestock States are available at the time revisions are being made. The calf crop is again subject to revision at 5-year intervals when the U. S. Census of Agriculture becomes available. Data on calves born during the year are usually not obtained from the census. However, the census number of cows may result in revisions in the January 1 inventory estimate of cows and heifers 2 years old and over, which may in turn provide the basis for changes in the calf crop estimates.

Lamb Crop

Lamb crop estimates are made in July and February each year for all States except Hawaii. A situation report on the early lamb crop is issued in March for the major early-lamb producing States: a quantitative estimate of the number of early lambs is made in three States.

The July Lamb Crop is the first report of the year showing estimates by States of the current year's total lamb crop. This report shows the estimated number of ewes 1 year and older on January 1, the number of lambs saved, and the percentage that the lambs saved are of the ewes 1 year and older on January 1.

The 48 conterminous States are often divided into "Native Sheep States" and "Western Sheep States." The term "Native" is applied to States where sheep are raised on farms; in the Western States most of the sheep are raised on large-scale operations on open range or big pastures. The 11

Western States, Texas, and South Dakota make up the "Western Sheep States." The 35 States to the east are the "Native Sheep States."

The indications for the July report are obtained from questions carried on the June rural carrier card in the Native States and from a special lamb crop and wool inquiry mailed to sheep and lamb producers in the Western States. In the Native States, respondents are asked to report the number of breeding ewes and ewe lambs kept for breeding on hand on January 1 and the number of lambs saved from lambs dropped between October 1 of the previous year and June 1 of the current year. In the Western States, respondents are asked for the number of ewes on January 1 and for the number of lambs marked, docked, or branded from October 1 to June 1. The information is summarized for each State by crop reporting districts.

The number of lambs saved is expressed as a percentage of the number of ewes 1 year old and over on January 1. As survey data relate to the number of breeding ewes at the beginning of the year, no adjustment is necessary in computing the reported percentage. For the Western States the lamb crop percentage is computed using ewes 1 year old and over. Changes in the reported age classification of breeding ewes between January 1 and June 1 are avoided in the Native States by using all ewes. This change in age classification is not a difficulty in the Western States.

The final report of a lamb crop is issued in February the following year. No additional survey data are used for this report. Revisions are based on assessors' enumerations, marketings, and other check data that have become available after the original estimate was made. The majority of the changes that are made at this time are the result of changes in the number of ewes 1 year and older and all ewes on January 1. Also taken into consideration at this time is a review of the national inventory numbers, lamb crop, and imports in relation to records of slaughter and death losses.

The early lamb crop report in March for the important early-lamb producing States is based on comments from reporters. The comments discuss such significant factors affecting the development of the early lamb crop as condition of

lambs, weight of lambs, feed supplies, development of pastures, weather, and marketings. Marketing comments cover such factors as the volume or probable volume in the current year compared with former years, earliness or lateness of marketings, and the expected month for peak marketings. Estimates of the number of early lambs are made in three States, based on information from lamb producers on the portion of the lamb crop dropped before March 1.

LIVESTOCK SLAUGHTER AND MEAT AND LARD PRODUCTION

Estimates of livestock slaughter and meat and lard production are published monthly in the Commercial Livestock Slaughter report, which contains three sets of data: (1) federally inspected slaughter data on number of head as obtained from the Meat Inspection Division, Agricultural Research Service, (2) average live weight data for federally inspected slaughter obtained from reports submitted by federally inspected plants, and (3) estimates of nonfederally inspected slaughter data on number of head and live weight. Beginning with the June 1960 report, published in July 1960, electronic data processing equipment has been used to speed preparation of the monthly slaughter report at the national level.

Federally Inspected Slaughter

Not all plants in the United States are required to have Federal inspection. However, all plants which engage in interstate shipments are required to have their meat inspected by a Federal meat inspector, who maintains a count of the animals inspected each day. These data on number of animals slaughtered are sent to the Washington office of the Meat Inspection Division, Agricultural Research Service. The number of head slaughtered in federally inspected plants is an actual count, while the average live weight and total live weight are estimated. Since the inspectors report only the number of head, a questionnaire is sent to all plants under Federal inspection to obtain data on live weight and dressed weight of animals slaughtered. The response is voluntary and not all plants return the questionnaire. Data are obtained from this questionnaire on number of animals slaughtered, total live

weight, and total dressed weight for each species slaughtered. From these data, an average live weight by States for each species is calculated, which is applied to the total number of animals slaughtered to obtain the total live weight by States for each species. An average dressed weight and dressing percentage is calculated for the United States; this percentage is used in determining the meat production in plants under Federal inspection.

The questionnaire sent to plants under Federal inspection also obtains data on the class of animals slaughtered and the cost of live animals slaughtered. These data are tabulated and estimates of classes of animals slaughtered are made for the U. S.

The proportion of total commercial slaughter that is federally inspected varies between species—from 87 percent of sheep and lambs to 65 percent of calves. As of January 1962 there were about 550 slaughtering establishments operating under Federal inspection.

Nonfederally Inspected Slaughter

The total number of slaughterers not under Federal inspection in the entire country in 1962 was estimated at about 8,000 establishments, including butchers who slaughter only during certain seasons. Estimates for this nonfederally inspected portion of the universe are made by States. These estimates include the number of head slaughtered, average live weight, total live weight, yield of lard per 100 pounds of live weight, and production of lard.

The nonfederally-inspected slaughter universe is stratified by size groups to aid in making the estimates. The stratification varies by States according to the type of establishment. In general, the universe is broken down into large, medium, and small plants. The "large" group includes establishments that slaughter 2 million pounds total live weight or more annually and establishments which usually slaughter a sizable number of a single species. Slaughtering establishments in the "medium" group have annual outputs ranging from 500,000 to 2 million pounds. The "small" group comprises slaughterers that average less than 500,000 pounds a year. An attempt is made to obtain complete coverage of the "large" group as well as a substantial portion of the

"medium" group. This is done by mailed inquiry, by telephone calls, or by personal visits.

The techniques employed in estimating the number of head slaughtered each month involve separate indications and expansions for each group. The matched-sample technique, with reports for the current month, is employed along with ratio-to-base and average per plant expansions. Separate estimates for each slaughter group are prepared, and the estimates for the total are the sums of the estimates for the individual groups. Research on methods of expansion has shown that for both the "large" and "medium" groups the number slaughtered during an earlier "base" period is highly correlated with the number slaughtered currently. The "base" period can be 1 month, 3 months, or any grouping of months. However, it must be for the same months for all plants in the universe.

In using the ratio-to-base slaughter method of expansion, it is necessary to establish a base number of each species slaughtered for each plant in the group. The current slaughter is expressed as a percentage of the base slaughter, and this percentage is applied to the total base slaughter of the group to obtain an indication of total slaughter by the group.

However, for the "small" group, the average number of head slaughtered per plant times the number of plants is usually the most efficient and is considered a maximum indication in most cases.

The reports showing both live weight and number of animals slaughtered make possible the derivation of the average live weight of animals slaughtered. This average live weight is used in estimating total live weight. No information is gathered on dressed weight for nonfederally inspected slaughter. The dressing yield is estimated on the basis of monthly relations between inspected and noninspected establishments and is used in the preparation of estimates for nonfederally inspected meat and lard production in the United States.

Total Slaughter

For all commercial slaughter the estimates on nonfederally inspected slaughter are combined with similar estimates for federally inspected slaughter to obtain the totals by States and for the United States.

For farm slaughter, annual estimates only are made by States. These estimates are based on information obtained from the rural carrier livestock surveys, the Farm Report, and the livestock disposition schedules on which questions have been included to obtain indications of average live weight and lard yield. Estimates of farm slaughter are also used in the annual release "Meat Animals: Farm Production, Disposition, and Income."

The annual publication for slaughter contains quarterly estimates for the United States of number of head slaughtered, average live weight, total live weight, average dressed weight, and total dressed weight for the federally inspected, other commercial (nonfederally inspected), and farm slaughter.

The present program on livestock slaughter by months and by States was inaugurated in 1946. Before World War II the only information available by months was that for federally inspected slaughter. Information on noninspected slaughter was obtained on an annual basis. During the war period, the government collected data from all slaughter plants on a monthly basis in connection with their control programs.

MEAT ANIMALS: PRODUCTION, DISPOSITION, AND INCOME

Estimates of the production, disposition, and income from meat animals—cattle, sheep, and hogs—are published annually in the report "Meat Animals: Production, Disposition, and Income." Included are: estimates by States of the number of pounds of each of the three species of live animals produced and sold, cash receipts, and gross income; estimates of number of deaths; and number of animals slaughtered for farm use.

Estimating livestock production by States is rather involved because of the manner in which livestock is raised and marketed. Livestock production comes from both the addition to numbers resulting from births and increase in weight due to growth of young animals. Only a part of the animals born reach maturity. Disposition is continuous, with no uniformity in ages or weights at slaughter or in the proportions disposed of from year to year. Livestock production is not always completed within the locality in which the animals are born. There is an extensive movement of unfinished animals out of

some States into others to be "grown out" or "finished."

Estimates of the annual volume of livestock production in each State for each species are developed in three distinct operations. The first involves the January 1 inventories. The number of each species is separated into significant age and sex groups. The average live weight per head for each of these groups is estimated. These average live weights are multiplied by the number of head in the beginning inventory in each corresponding group, and the sum of the total weights of all groups gives the total inventory weights at the beginning of the year. This is also done for the following January 1 inventory, and the positive or negative difference between the aggregate live weight at the beginning and end of the year is the increase or decrease in inventory weights. Since the average live weight for each class does not vary significantly from year to year, most of the difference in inventory weights is due to changes in the consist of the inventory rather than to changes in average live weights. Specific annual data on inventory weights by classes within each species are obtained at 5-year intervals.

The next operation is to determine the items of increase and decrease that are responsible for the changes in inventory numbers during the year. For this purpose the State balance sheet is used. (See Appendix A, exhibit 24.) The State balance sheets have a dual role. The first is to provide an indication of the year-end inventory and to check on the relation between the supply and disappearance items. (See earlier discussion of "Balance Sheets.") The second is to provide data needed in the preparation of estimates of production, marketings, inshipments, farm slaughter, deaths, cash receipts, and gross income for the Production, Disposition, and Income report. The balance sheet brings together the various estimates for each of the supply and disappearance components. Each of the component series in the State balance sheet is subject to estimating errors. In the published balance sheet, it is necessary to make adjustments in each State so that the beginning inventory plus births and inshipments minus marketings, farm slaughter, and death loss equals the ending inventory.

The balance sheet approach is a check on the net effect of all of the components. It is necessary that each component be estimated as accurately as possible and that, insofar as possible, discrepancies be taken care of in all of the components. To avoid a buildup of error, consideration must be given to the balance sheet in estimating not only inventories, but also births, farm slaughter, and death loss. Revisions may be made for the preceding year in conjunction with preparation of the current report, and estimates for the preceding 5 years are subject to revision after each census. Revisions in the January 1 inventories account for most of the revisions in the balance sheet, although final data from the State farm census and also from the market records may result in revisions among the component items.

The third step in estimating annual volume of livestock production is the determination of the total pounds of live weight involved in the balance sheet items. For each series of numbers of animals shipped in, marketed, slaughtered locally, and slaughtered on farms, a corresponding series of estimated live weights by species by States is required. The product of numbers times average live weight gives the total pounds. For hogs this is a single computation. For cattle and calves the yearly number marketed and slaughtered and the corresponding average live weights must be estimated separately. Inshipment numbers and live weights are estimated separately for sheep and lambs. Numbers and average live weights of farm slaughter are estimated separately for cattle, calves, sheep, and lambs. The total weight of animals marketed, slaughtered locally, and slaughtered on farms is obtained for each species. From this summation, the total weight of animals shipped in is subtracted. The resulting difference is adjusted by the plus or minus difference between the beginning-of-year and end-of-year inventory live weight aggregates. The final amount represents total production in pounds.

The value of this production is determined by multiplying the total pounds produced by the weighted average price per pound received by farmers. The price is obtained by weighting the monthly prices by each month's proportion of the total yearly marketings. The inventories at the beginning and at the end of the year are not evaluated; hence, changes in inventory values due

to changes in unit values are not included in value of production except that changes in physical inventories are evaluated in the second step in the estimating procedure, as described above. In this procedure the animals shipped into the State are not evaluated at an average cost; only their increase in weight is evaluated and that not separately, but as a part of the total production. Animals that die are not considered as animals produced. Young animals that die within the year in which they were born are not included in the production figures. Animals in the beginning-of-the-year inventory that die during the year are included in the previous year's production but are deducted from that of the current year. These inclusions and deductions, however, are made in the balance sheets and not in the actual production figures.

The procedure used to estimate farm production from meat animals permits the computation of cash receipts and gross income from meat animals. To obtain cash receipts, the estimated marketings and slaughter (in pounds), by States, are multiplied by the respective season average prices. Gross income is the sum of the cash receipts and the value of farm slaughter for home consumption.

MISCELLANEOUS LIVESTOCK REPORTS

Cattle and Calves on Feed for Slaughter Market

The practice of feeding cattle on a fattening ration in a more or less confined area for several months before slaughter has increased significantly in the last 10 years, especially in the Western States where there has been an increase in large commercial feedlots.

At present cattle on feed estimates are made in 39 States: 7 on an annual basis (January 1), and 32 on a quarterly basis (January 1, April 1, July 1, and October 1). Of the 32 States, 5 also issue a monthly report in February, March, May, June, August, September, November, and December.

For States in the annual program, only the number on feed on January 1 is published. Under the quarterly program, reports include State estimates of the number of animals on feed for slaughter market classified by weight groups, kind of cattle, and length of time on feed. The quarterly reports also include estimates of the num-

ber placed on feed, the number marketed in the preceding quarter, and the number expected to be marketed in the succeeding quarter. The monthly reports between quarterly reports include only the numbers on feed and placements and marketings during the past month. Cattle and calves on feed are defined as animals being fattened for the slaughter market on grain or concentrates which are expected to produce a carcass that will grade Good or better.

Sources of data

The main basis for these estimates is the mailed inquiry to cattle feeders. (See Appendix A, exhibit 25.) The survey procedures differ somewhat between States, the procedure used depending on the consist of the cattle feeding universe and availability of feeders' names.

In most Corn Belt States the list of cattle feeders is obtained from State farm census listings. State farm census questionnaires have questions on fed cattle marketed or placed on feed during the year. The random probability sample of feeders drawn from these listings may be handled in one of several ways: (a) it may be a continuous list with some replacement of individual names, (b) it may be a list, a third of which is dropped and replaced each year, or (c) it may be an entirely new sample drawn each year. Information on marketings or placements from the State farm census listings is used as control data to adjust averages per farm reported from the quarterly sample surveys of cattle on feed to a level comparable with the universe.

In several States, the December rural carrier livestock questionnaire is the primary source of the mailing list. A sample is drawn from questionnaires reporting cattle on feed, and another sample is drawn from those reporting no cattle on feed. These "nonfeeders" are surveyed each quarter along with the "feeders" to obtain a measure of new feeding operations and to make an allowance for farmers who feed during other periods of the year. Reported information on cattle on feed and on all cattle from the December rural carrier questionnaire is used as control data for adjustment and expansion of reported data.

In the Western States and several other States where a sizable portion of the cattle on feed are in large commercial feedlots, the cattle feeding

universe is broken down into two or more categories based on feedlot capacity. Generally the large group includes those with a lot capacity in excess of 500 or 1,000 head. Questionnaires are mailed to these large feedlot operators each quarter or month, and any who do not respond are contacted by phone or personal visit. Estimates for the remaining smaller scale feeders (if there are only two classifications) are based on the mailed sample. In most States where this method is used, a large proportion, usually well over half of the cattle on feed for that State, are covered in the enumeration of large feeders. This leaves a relatively small proportion to be estimated from a sample. Mailing lists are obtained from all available sources, and in most of these States a list of the entire cattle feeding universe is maintained and used.

Since there have been no census data available for establishing a benchmark each 5 years, it was necessary to develop check data on marketings of fed cattle to verify the level of the estimates. Data on beef steers and heifers sold out of first hands for slaughter, by State of origin at 14 major livestock markets, are tabulated by months and quarters to provide such a check. Also, in a number of States check data on fed cattle marketings have been developed through information obtained from packing plants as to volume of fed cattle slaughtered. In some States brand inspection data are also used as a check on marketings.

As the completed questionnaires are received in the field offices they are edited for completeness and reasonableness and are verified as to whether the cattle and calves reported as on feed are actually on feed. This latter can be checked by the questions which relate to the kind and amount of feed fed, weight groups, and length of time the cattle and calves had been on feed. The decision as to whether animals are actually on feed is very important. Some reporters may include dairy animals or those which are only on a maintenance ration; these must be eliminated so that the survey tabulations will reflect only those animals actually on feed, in order to meet the primary definition. The questionnaires are then summarized, and district and State totals are obtained.

For the quarterly reports, the questionnaires are matched with questionnaires for the preceding

year and the preceding quarter and are summarized on the basis of matched or identical feeder farms. States making only the annual (January 1) cattle on feed report match the current year with the previous year. States making the monthly reports match the current questionnaires with the previous month, quarter, year, or some other base period.

Quarterly estimates

The basic indications used in making the quarterly number on feed estimates are: (a) average per farm (adjusted or unadjusted) times number of feeder farms, (b) identical current/current percent of previous year, (c) identical current/current percent of preceding quarter, (d) ratio-to-capacity times feedlot capacity. In addition, States which use the December rural survey as a source for the mailing list have procedures for combining the cattle on feed reported on the "feeder" and "nonfeeder" lists. The indications are put on correlation "dot" charts, plotting the survey data vs. Board estimates for a historical period. These charts permit adjusting for any bias in the survey indications which has become apparent over a period of time.

The current survey average number of cattle on feed per farm in States that have State farm census information available on cattle feeding is adjusted for bias as follows: The information on cattle feeding from State farm census listings is recorded along with the reporter's name on the questionnaire. These are known as the control data. These control data from the State farm census as recorded on the mailed returns are compared with the same data for the entire State farm census universe and this relation is used in adjusting for bias in the current data.

The quarterly number on feed estimates must tie in with marketing and placement information for the previous 3-month period. The number of short-fed cattle (placed on feed and marketed during the preceding 3-month period) must also be accounted for and included in making these marketing and placement estimates. The adopted estimate for number on feed, placements, and marketings must balance out from quarter to quarter, and for monthly States, from month to month.

The estimate of marketings can be arrived at from the survey indications in two ways: (a) Survey reported marketings for the previous quarter are calculated as a percent of the number on feed at the end of the quarter. This percentage is then multiplied by the estimated number on feed at the end of the quarter to obtain a marketing indication. (b) An additional marketing indication is obtained by using the data on length of time on feed from the survey. The number on feed at the beginning of the quarter minus the indicated number on feed more than 3 months at the end of the quarter equals net marketings during the quarter. This net marketing figure is then expanded to total marketings to include short-feds by dividing the net marketings by the percent that net marketings are of quarterly marketings. This indication is, of course, dependent on the survey percentages for length of time on feed which are subject to some adjustments mentioned in the discussion of length-of-feeding data below.

In the States where market check data are available from 14 of the major markets or from brand inspection or other data, a good check can be made of marketings for each 3-month period. The estimate of the number placed on feed for any 3-month period must equal the number on feed less than 3 months at the end of the quarter plus short-feds placed and marketed during the quarter.

Market check data on fed cattle marketings are obtained as follows: Tabulations are made at each of 14 major livestock markets on steers and heifers sold out of first hands for slaughter that grade Prime, Choice, or Good, by State of origin. The determination as to grade is made from price quotations compiled by the Livestock Market News Service. Data on "direct" marketings of fed cattle are also obtained from packing plants in some States. These check data on marketings of fed cattle comprise a sizable proportion of the marketings of fed cattle in most of the Corn Belt States. The data can be expanded to represent all fed cattle marketings (all markets and all sales) through the relation with total recorded marketings for each State which account for most of the cattle marketings. The trend and the level of these market check data over a period of time are valuable in making the

marketing estimates and as a check on the estimated number on feed. If over a quarterly period the number marketed as indicated by the check data just described is at a level not consistent with number-on-feed estimates there is the probability that the number-on-feed estimates either at the beginning or end of the quarter is not on the correct level.

The problem of estimating becomes more difficult in States for which the market check data in the 14 central markets do not comprise a significant amount of the marketings of cattle for slaughter. Several of the Western States have brand inspection data which can be used as a valuable check on fed cattle marketings. Brand inspections, verifying ownership, usually are made when cattle are moved any distance or sold for slaughter. In several other Western States where neither market check data nor brand inspection data are available, periodic complete enumerations of cattle feeders are made. This can be done fairly inexpensively and easily where there are relatively few feeders—say less than 500. Also, in the Western States and in several other States a large proportion of the cattle on feed are accounted for in the larger-feeder enumeration, which tends to minimize errors in the estimates.

The quarterly questionnaire obtains information on length of time the cattle have been on feed: less than 3 months, 3 to 6 months, and over 6 months. Information is also asked on the number of cattle on feed by classes (steers, heifers, and cows) and by weight groups (under 500, 500–699 pounds, 700–899 pounds, 900–1,099 pounds, and 1,100 pounds and over). The reported data are evaluated carefully when the questionnaires are edited. The estimated breakdown by classes and weight groups is largely based on the percentages reported on the survey for each of these categories. However, the answers to questions about length of time on feed are subject to a special editing process.

It has been found that reporters often misclassify the time that cattle and calves have been on feed in relation to previous reported inventory numbers and currently reported marketing data. In order to correct these misclassifications, special listings are made for each report, comparing the current report with the previous quarter. The number on feed the previous quarter minus

marketings (adjusted for short-feds) plus the number on feed less than 3 months should balance out reasonably well with the number on feed in the current quarter. If it appears that a significant number have not been moved forward in the time-on-feed categories or have been misclassified in relation to the other reported data, the time-on-feed reported data is appropriately edited. The edited reports, which are comparable from quarter to quarter, are used to adjust the length of time on feed for the entire sample. As previously described, the time-on-feed estimates are used in estimating placements and marketings. The editing of the time-on-feed data therefore affects estimates of the number on feed. This editing has been found to be a sound procedure and a material aid in making placement and marketing estimates.

The quarterly questionnaires also ask for the expected marketings of fed cattle for slaughter during the next 3 months. Over a period of time, varying amounts of bias were found in these reported intentions to market fed cattle. This bias was not the same for each quarter. In order to evaluate survey data so that better estimates can be made, two procedures are used: (1) The expected marketings reported in the survey for the 3-month period are plotted on dot charts against the Board's estimates of net marketings for the same period historically. This points up the bias in the reported information and allows for adjustment for this bias. (2) The weight breakdown information of the cattle on feed inventory is a valuable indication of the marketings to occur in the succeeding 3-month period. For example, all of the steers and heifers weighing over 1,100 pounds and varying percentages of the other weight groups presumably should come to market before the end of the quarter.

Indications from these two procedures are evaluated in estimating intended marketings of fed cattle. Although actual marketings may differ from these intentions, the procedures have been very valuable and generally measure the trend of intentions to market better than unadjusted expected marketing data from the survey.

In States having two or more size categories for cattle-feeding operations, the approach is to estimate for each group separately the number on feed, marketings, placements, weight groups,

and other items (except marketing intentions). The size groups are then combined to obtain estimates of marketing intentions for the State.

Annual and monthly estimates

States making only the annual January 1 survey depend largely on the following indications: The average per farm times number of feeder farms, the identical current to current percent of preceding year, and the current to historic percent of the previous year. The latter is obtained from the current questionnaire which asks number on feed a year earlier as well as at the current period. Since only limited market check data are available in these States, considerable stratifying by size groups is done to provide better control in estimating. Enumerations are made of the larger feeding operations and of some of the smaller feeders. County agent information on lists of cattle feeders and size of operations has proved very helpful.

The interim monthly cattle on feed estimates include only numbers on feed, placements, and marketings of fed cattle during the past month. In these States a large proportion of the estimate is accounted for by enumerations of the larger feeders. The smaller feeders are estimated from a sample, using average per farm indications and identical matchings with the previous month, year, or base quarter. Placement and marketing estimates by months must add to the quarterly estimates, and the quarterly placement figures must tie in with the number on feed less than 3 months, allowing for short-feds.

Revisions

The annual (January 1) estimates of cattle on feed are subject to revision a year later and at the end of the 5-year census period in conjunction with other livestock estimate revisions. The quarterly cattle on feed estimates are subject to revision on the succeeding quarterly date and at the end of the year. They are also subject to revision at the end of each 5-year census period. The monthly estimates can be revised at the end of the quarter, the succeeding quarter, the end of the year, and every 5 years. Revisions in published estimates are sometimes necessary because additional data or check information has become available or because estimating problems in a cur-

rent period can be reconciled only by revising earlier quarters or months. Also, cattle feeding and marketing practices often change, and delay in keeping up with these changes may necessitate revisions in previous estimates.

Sheep on Feed

Estimates of the number of sheep and lambs on feed for market in 26 important sheep-feeding States are made as of January 1. For the seven largest feeding States, estimates are also made as of November 1 and March 1. In these States, the estimates in each of the reports include, in addition to the total number on feed, the number on feed by weight groups and the number placed on feed during the preceding 2 months. The January 1 and March 1 reports also include estimates of marketings during the previous 2 months. As part of the January 1 report, estimates of sheep and lambs on winter wheat pasture in Western Kansas, Western Oklahoma, and the Texas Panhandle are made. (See p. 109.)

Sheep and lambs on feed include only animals intended for slaughter market that are being fed on grain or other concentrates and those being fed on succulent pastures that are expected to produce a carcass that will grade Good or better. Milk fat lambs are not included in the on-feed estimate.

Current estimates of feeder sheep and lambs are based on enumerations and special surveys and on inshipments and feed supplies. Because different sources of names are used for the mail survey, the sampling plan can vary between States. The universe is usually divided into two strata: (1) large or commercial feeders, and (2) farm feeders. A complete enumeration of large feeders is usually obtained by a followup of the mail survey with a second request in the form of another questionnaire, telephone call, or personal contact. If a complete enumeration is not obtained, the survey can be expanded by using the percent change (based on identical reports) from the previous period and the previous year to determine the current number on feed.

In the farm feeder group, questionnaires are sent to a sample of the universe. The inquiry asks for the current number on feed and the number a year earlier, along with weight, class, mar-

ketings, and placement information. The current to historic (C/H) percent change computed from the sample is one indication of the change in number. Also, returns for the current reports are usually matched with returns for the corresponding period a year earlier on "number on feed" to arrive at an indication of change called current to current (C/C) percent change from the previous year. Questionnaires for the January 1 report are also matched with the November 1 return, and the March 1 return is matched with the January 1 return in the States where the seasonal surveys are made. This gives a C/C percent change indication from the previous period in the current feeding season. The survey provides an indication of marketings and placements during the past 2 months. Estimates of kind on feed (sheep and lambs) and weight groups are based mainly on the percentage that each category is of the sample total.

Revisions of the estimate of January 1 sheep and lambs on feed the previous year are based on marketings, inshipments, and any other check data which have become available since the original estimate. Market records for all major terminals are kept by State of origin. Brand inspection data and veterinary inshipment records are also used in States where available. In those States making the three seasonal surveys, the revision for November 1 can be made the following January and the following November. January 1 revisions are made the following January 1, and March 1 revisions are made the following March 1. These revisions are based mainly on the marketing data available. Estimates are also subject to revisions after each Federal agricultural census enumeration, although the census enumeration does not provide a direct benchmark for sheep and lambs on feed.

Shipments of Stocker and Feeder Cattle and Sheep

A monthly report is developed from records of animal health inspections maintained by the offices of the State veterinarians in selected North Central States. Livestock shipped into these States for feeding and breeding are required to have a health certificate. If such shipments originate at public stockyards or stop at these

yards for feed, water, and rest, they are inspected by the Animal Disease Eradication Division of the Agricultural Research Service. Direct shipments into the States may be accompanied by a health certificate or be inspected at the point of destination. The monthly summary of these records shows shipments of cattle and sheep from public stockyards and direct shipments separately for each State.

In addition to the inshipment data for these selected States, shipments of stocker and feeder cattle and sheep from public stockyards are also published in the monthly report by market origin and State of destination. These data are tabulated from the inspection records of the Animal Disease Eradication Division.

These two reports on shipments of livestock provide current information on movement into the important livestock sections of the country.

Wool and Mohair Production

Wool

Wool production estimates by States are made each July and March. The reports are based on information from the June and December rural carrier cards in the Native Sheep States; in the Western Sheep States the reports are based on information from mailed inquiries to sheep and lamb producers.

Census data have been available every 5 years on the number of sheep shorn and pounds of wool produced. These items provide information for the benchmark estimates. Wool production is estimated by ascertaining the number of sheep shorn and the average weight per fleece. Producers are asked to report the number of sheep and lambs shorn on their farm or ranch and the pounds of wool shorn from them. From this information the average weight per fleece is derived. Comparisons over a period of years have determined the relation of the number shorn to the total inventory in the Native States. The percentage shorn fluctuates very little from year to year in these States. The main change in numbers shorn is due to the overall change in inventory numbers of sheep. In the Western States information is obtained on the losses of sheep between January 1 and the date of shearing; the percentage loss is used to adjust the January 1

inventory to obtain the number of sheep and lambs shorn.

Shearing of sheep and lambs in feed lots has increased in importance in recent years, and in several States separate estimates are made for fed sheep and lambs shorn. In States where separate estimates are made of stock sheep shorn and fed sheep shorn, the two estimates are added together to obtain the total number of all sheep and lambs shorn and total wool production. The relation between census data and survey data has largely determined the sample bias to be considered when estimating the average weight per fleece from survey data. The current estimate is interpreted on a chart by plotting the survey average weight per fleece against the Board's average weights for a series of years. The preliminary estimates of shorn wool made in July take into account allowances for fall shorn wool in States where fall shearing is practiced.

When the final estimate is made in March of the following year, records have been assembled on: assessors' enumerations; wool shipments by truck, rail, or boat; receipts at warehouses; deliveries to cooperatives and pools; marketings; and other data which have become available since the original estimate was made. Data from applications filed in connection with the wool incentive payment are also used. However, the payment program relates to all wool sold during the marketing year, and allowances are made for early shipments sold in the preceding marketing year and for carryover from one clip year to a later marketing year. Data are now collected in connection with the wool incentive payment program on month and year of clip and the number shorn.

For the United States as a whole, records of domestic wool consumption and stocks are available from reports published by the Bureau of the Census. For some years data are also available from Government wool programs on wool purchases and wool placed under loan. These data have been used as checks against the annual estimates for the country as a whole.

Estimates of the production of pulled wool are based on mailed reports received from all of the pulleries in the United States. Pulleries report on the total quantity of pulled wool produced and the average weight of pulled wool per skin.

Mohair

Estimates of the number of goats clipped and of mohair production are prepared for the seven principal producing States by much the same methods used for estimating wool production. One main difference is that, except for Texas, no official estimates are made for the January 1 inventory of goats. Thus, the estimated number of goats clipped in six of the States is not dependent on the January 1 inventory number as in the case of sheep shorn. Estimates of the number of goats clipped are based on: (1) sample returns from mohair producers who report goats clipped and production of mohair, and (2) records of mohair received at warehouses, purchased by dealers, or shipped by truck, rail, or boat and deliveries to cooperatives and pools. In States where goats are clipped twice a year information is obtained separately for spring and fall production of mohair and kid hair and for the number of goats and kids clipped. Census data on angora goats clipped, mohair produced, and average clip per goat provide the basis for benchmark estimates. Revisions of the number of goats clipped, weight per clip, and mohair production are based on number of goats assessed, mohair shipments, mohair marketings, and other data which may have become available since the original estimate was made.

Western Range and Livestock Reports

Reports are issued each month showing the reported condition of range feed, cattle and calves, and sheep and lambs in 17 States, comprising the 11 Western States, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Also included are descriptive comments covering each State individually and the western range area in general on range feed conditions, feed prospects, moisture conditions, livestock conditions, and other matters. These reports are now released in Washington, D.C.: before July 1962 they were released from the now-discontinued Western Livestock Office in Denver, Colo.

These reports are based on mailed inquiries which are sent each month by the State Statistician's office to ranchers and farmers in each of the 17 States. These respondents are asked to report their appraisal of conditions of range feed

and of cattle and calves and sheep and lambs on a numerical rating basis for their localities. The following suggested rating method is shown on the mailed inquiries: 49 or below is very bad; 50-59 bad; 60-69 poor; 70-79 fair; 80-89 good; 90-100 very good; 100 and over is excellent. In certain months special questions are included covering marketings of livestock, average live weight of livestock sold, and quantities of supplemental feed fed. The respondent is also asked to make pertinent comments on the questionnaire concerning range feed conditions, future feed prospects, livestock conditions, and so on. The reported information is summarized by districts in each State.

Wheat Pastures

A special wheat pasture report was inaugurated in the fall of 1961. This report covers condition and carrying capacity of wheat pasture in the major wheat areas of Kansas, Oklahoma, and Texas. The areas include the western two-thirds of both Kansas and Oklahoma and the Texas Panhandle. A report for Kansas only is issued for September 1, and a report for all three States is issued as of October 1, November 1, and December 1. Data and information for the wheat pasture report are provided by wheat growers, ranchers, and farmers. A general statement regarding current prospects by States is released each month (except only in September in Kansas). The October, November, and December releases have a table showing averages for each State indicating: (1) percent of seeded wheat with sufficient growth to pasture, (2) percent of seeded wheat being pastured, and (3) acres of wheat pasture required to carry a 400-pound calf through the fall and winter. A weighted average for each of these three items is also released for the entire wheat pasture region. The relative condition of top growth available for grazing is indicated on a map which shows the rating of winter wheat pasture as excellent, good, fair, or poor.

The number of sheep and lambs fattened on wheat pastures in Kansas, Oklahoma, and Texas is estimated January 1 each year and released in connection with the January 1 report of sheep and lambs on feed. Also, the January 1 Livestock Inventory Report includes estimates of all

cattle, by classes, in the aggregate wheat pasture area of these three States.

Bluestem (Flint Hills)-Osage Pasture Report

A special report is issued each June for the Bluestem (Flint Hills) Pasture Section of Kansas and the Osage Pasture Area of Oklahoma. These pasture areas are utilized extensively each spring and summer for grazing considerable numbers of cattle which are shipped in from other areas. The report covers condition of cattle and pasture feed in these areas as of June 1, percent of available pastures filled by June 1, the cattle population of the area on January 1, and estimates of cattle shipped into these sections January through May. The information on condition of cattle and pasture feed and percent of pastures filled is obtained by mailed questionnaires to farmers and ranchers in the area and contacts with informed persons. Estimates of number shipped in are obtained from the records obtained from stockyards, railroads, and brand and inspection services. Inventory estimates for the area are developed in a manner similar to that used for the inventory estimates for the State, using data from the December rural carrier livestock survey.

Numbers of Livestock Farms by Species

The rapid decline in farm numbers in recent years has resulted in a bias in the "ratio per farm" as an indication of inventory numbers. The decline in the number of all farms brought corresponding reductions in the numbers of farms keeping the various species of livestock. These rates of decline have varied between kinds of livestock farms within the same State and are generally different between States. For each State, annual estimates are made of the number of farms with (a) cattle, (b) milk cows, (c) hogs, (d) sheep, and (e) any livestock. Estimates

of numbers of livestock farms, although not published, are used to adjust the State indications of "ratios per farm" in the major livestock surveys.

Data relating to the proportion of farms keeping the various species of livestock are available from several sources. Farmers who receive the annual fall acreage and production inquiry are asked to check "yes" or "no" as to which of the various species of livestock are on their farm. (See Appendix A, exhibit 26.) The percentage answering yes for a certain species is multiplied by the official USDA series of all farms for the same year to derive a computed number of farms for the particular species in the State. In the State farm census, counts of farms reporting production of certain species can either be converted to percentages of all farms listed, and the resultant percentage used to calculate the number of farms in the manner just described, or the item counts may be used as a direct indication of farm numbers if the State farm census is fairly complete. The enumerative survey is now providing estimates with relatively high statistical reliability of the total number of farms having each species of livestock in the particular State. The rural carrier survey itself provides an indication of the relative numbers of farms with each species, but since only livestock farms enter into the tabulations, the item counts in themselves do not constitute a basis for estimating the total number of livestock farms.

The different indications of farm numbers for each species are plotted as a time series on semi-logarithmic paper on which census numbers of farms reporting the particular species are also shown. From these charts annual estimates of farms for each species are developed for each State using the same concept or definition of a farm as the Bureau of the Census.

CHAPTER 7. POULTRY*

The poultry estimating program of the Statistical Reporting Service provides statistics on chickens and turkeys—on live birds, meat production, and egg production.

The reports in which these statistics are published may be divided into six main categories, namely: (1) Inventory numbers; (2) egg production; (3) hatchery production; (4) number raised; (5) poultry—production, disposition, and income; and (6) miscellaneous poultry reports, which include statistics on poultry slaughter, egg products produced, chickens and turkeys tested, and pullet chicks placed for hatchery supply flocks. (See table 5.)

This comprehensive program has evolved from a small beginning in 1919 on the January crop questionnaire. This feature was repeated each year until January 1924, when poultry questions were included on the rural carrier survey. At that time the Department also started using monthly inquiries to secure current data on numbers of layers and production of eggs.

Between 1937 and the mid-1940's, intensive studies were made of poultry statistics, including inventory numbers, chicken and egg production, and disposition, marketing records, commercial hatchery production, and various other data. The results of these studies were the basis for the series of estimates of chickens (issued in 1950) by States extending back to 1924 and estimates for the United States back to 1909. The estimates on the inventory number and production of turkeys date back to 1929.

After World War II the production of poultry moved rapidly from a general farming operation into a commercial operation. It soon became apparent that more frequent reports were needed. As a result, weekly reports were started on broiler placements and poults hatched. Several other reports were started on a monthly basis on chickens and turkeys tested for pullorum disease and pullet chicks placed for hatchery supply flocks.

For most poultry inventory reports the Census of Agriculture taken every 5 years provides an

enumeration of poultry on hand. This enumeration is used as a benchmark in establishing the level of the estimates. The use of the census enumeration as a benchmark will be discussed more fully in the next section of this chapter.

For most of the estimates more than one survey indication is available on which to base the estimate. In arriving at the estimate the statistician must make full use of his experience, knowledge, and judgment in determining the relative weight to give to each indication.

INVENTORY NUMBERS ON HAND

Numbers and Value: January 1

Estimates are made of poultry on farms and ranches on January 1 for chickens and turkeys. The estimates include the total number of each species broken down into various groups.

Chickens are divided into three main groups: (1) hens, (2) pullets, and (3) other chickens.

The January 1 estimates for turkeys show the number of (1) all turkeys and (2) breeder hens, with each classed as heavy breeds and light breeds. The heavy white breeds include all heavy-white feathered breeds, such as Broad White, White Holland, Empire White, and Lancaster, and crosses of these with light breeds. The heavy breed group also includes all other heavy breeds, most of which are Broad Breasted Bronze. Light breeds include the Beltsville Small White, Jersey Buff, Royal Palm, and wild turkeys.

The general level of the January 1 inventory estimates in each State is based primarily on enumerations by the Census of Agriculture which is taken at 5-year intervals. Year-to-year changes in numbers are based on sample indications from mailed and enumerative surveys. These include the semiannual livestock and poultry surveys made in cooperation with rural carriers, probability mailed sample surveys, and general-purpose enumerative surveys. Consideration is also

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TABLE 5.—*Statistical Coverage of Poultry*

Item	Number on farms	Breeding intentions		Number raised	Inshipments	Deaths	Production	Disposition	Sales	Prices received by farmers	Value of sales	Slaughter			Value of home consumption	Gross income	Value of production	Stocks (cold storage)
			Births									Commercial	Federal	Farm				
Poultry and poultry products:																		
Canned poultry.....							X											
Chickens.....	X	X		X			X	X	X	X	X	X	X		X	X	X	X
By classes, Jan. 1.....	X					X												
Layers on hand, Jan. 1.....	X																	
Layers on hand, monthly.....	X																	
Commercial broilers.....							X			X			X				X	
Hatched in hatcheries.....							¹ X			² X							X	
Pullets not of laying age, selected months.....	X																	
Pullet chicks for broiler hatchery supply stocks.....							X											
Testings for Pullorum disease.....	X																	
Ducks.....													X					
Eggs.....							³ X	X	X	X	X				X	X	X	X
Dried.....							X											
Frozen.....							X											X
Liquid.....							X											
Turkeys.....	X	X		⁴ X		X	X	X	X	X		X	X			X		X
Breeder hens, Jan. 1.....	X	X																
Hatched in hatcheries.....							⁵ X			X								
Testings for Pullorum disease.....	X																	

¹ Published separately for broiler type and egg type chicks.

² Prices received by hatcheries.

³ Per layer on hand Jan. 1; per layer on hand during year and total, annually; and per layer on hand and total, monthly.

⁴ Also intentions to raise turkeys reported in January.

⁵ Published separately for heavy white, other heavy and light breeds.

given to the changes indicated by general crop respondents and commercial egg producers.

Additional check data become available during the year to which the estimates relate. These data are considered at the end of the year, and, if necessary, the first estimate made at the beginning of the year is revised at the end of the year. The estimates of inventory numbers for the previous 5 years are also subject to revision at 5-year intervals in connection with the Census of Agriculture.

Use of census data

Census data for each State are first reviewed simultaneously with other available information, such as previous census enumerations, State farm

census tabulations, and poultry assessment records to appraise the completeness of the census in terms of number of farms, land in farms, and number of each individual species of poultry.

When the census enumeration is taken at a date other than January 1, allowances need to be made not only for possible incompleteness but also for changes in poultry numbers between the date of the census and January 1. The 1954 and 1959 censuses were taken in the fall, centering around the middle of November in most States. The procedure for adjusting census data taken in the fall to the following January 1 basis necessarily differs from the adjustment procedure used in earlier years when the census was taken in January or April. However, the same principles apply.

For chickens, two other indications are used in establishing a factor to adjust the census enumeration to a January 1 base. The first indication is computed from the change in estimated holdings of potential layers from the date of the census to January 1. The second indication is derived by comparing indications of numbers of layers that were culled and that died and of number of pullets added to the laying flock between date of enumeration and January 1. The change shown by these indications is used to adjust the census to a January 1 equivalent. The January 1 estimate for the census year is then set on the basis of the indicated census number adjusted by the above methods and the indications from the sample surveys.

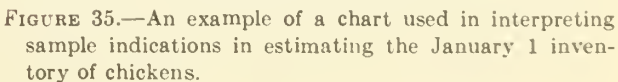
In the years between censuses, the January 1 estimates of inventory and of percent change from the preceding year are based largely on indications obtained from sample surveys, both mailed and enumerative.

In estimating the current January 1 inventory number and its percentage change from a year earlier, two indications used are (a) ratios or average per chicken farm adjusted by the estimated number of farms and (b) the "identical" percent change as derived from matched samples. The numbers indicated by both indications are

For the ratio indication, regression charts are used for each State. The latest Board estimates of actual number of chickens on that date are plotted against the sample average per farm adjusted for the change in the number of farms. (See fig. 35.)

This indication is used by plotting on a regression chart this matched sample percentage change from the previous year against the Board's final estimates as percentages of previous years. The percentage read from this chart is applied to the estimate of chickens on hand January 1 of the preceding year to obtain a current indication of the number of chickens on hand.

The annual inventory estimates of pullets, hens, and other chickens are based on separate indications for each class. Not only are the two previously mentioned indications used, but the sample percentages of each class to total chickens are calculated as additional indications. The ratios



for each class are used in order to be certain that Board estimates by classes do not deviate from the actual relation between classes.

For further details on inventory estimates of chickens and the rural carrier survey, see the discussion on the January 1 estimate for livestock in Chapter 6; inventory estimates for chickens are similar to those for livestock.

Use of survey data—turkeys

The January 1 turkey inquiry provides the basic data for indications on inventory numbers as well as other data. Variation in turkey numbers between farms and ranches is so large that the averages per farm are not considered dependable indications. Intensive sampling with proper stratification and varied rates of sampling is necessary to obtain a reliable measure of change. The survey questionnaires are designed to obtain reports on the number of turkeys that were on hand a year earlier as well as the current number on hand. This provides an indication of change in numbers between the years. This indication is referred to as the current/historic percentage (C/H percent).

A second indication is obtained by matching reports from producers who returned questionnaires in both the current and the preceding year. From this matching, a C/C (current/current) percentage of the preceding year's number is computed.

The C/H and C/C percentages are plotted on regression charts against the Board's final percent change for a series of years.

In addition to the indications from the January 1 inquiry, testings of turkeys from July through the following March for pullorum disease are used as an indication of breeder hens on hand.

Value of poultry on hand January 1

Estimates of the value of poultry on hand on January 1 are made for both chickens and turkeys.

The value of each species is obtained by first making an estimated value per bird of each class. This value per head is then multiplied by the number of birds in that class. The sum of the total values for each class is the total value for that species.

Values per bird are based on reports from producers on the value per bird of poultry in their locality as of January 1.

Revisions

The January 1 estimates of inventory numbers are revised if necessary a year later and at the end of the 5-year census period. Revisions the following year are based on records of poultry assessed, slaughter, and other check data which may have become available since the original estimate was made.

Composition of Farm Flocks on October 1

A preliminary estimate of the composition of farm flocks preceding the January 1 final report is made in October and published that month in the general Crop Production report. Data are collected on the October Farm Report and the monthly commercial poultry questionnaire. October preliminary estimates are made for pullets of laying age, pullets not of laying age, other young chickens, all young chickens, and hens 1 year old or older. The indications used to compute these estimates are the percentages calculated item by item—for each item as a percentage of layer numbers.

Pullets Not of Laying Age

Estimates of the number of pullets not of laying age on hand on the first of the month are made August 1 through January 1 and published by regions in the monthly Crop Production report. The estimate of pullets not of laying age is added to the estimate of number of layers on hand and the sum published as the number of potential layers.

To obtain the monthly indication of pullets not of laying age, the estimated number of layers on the first of the month is multiplied by the reported ratio of pullets not of laying age to number of layers. In order to show the seasonal and annual changes, care is taken to maintain sample comparability between numbers of layers and numbers of pullets not of laying age. The hatch data, which include pullets for farm flock replacement and breeder pullets for broiler hatching egg flocks, are checks on this estimate of pullets not of laying age.

October Intentions To Keep Turkey Breeder Hens

A report on intentions of breeders to keep breeder hens for the coming hatching season is issued in October for the 15 major turkey States. This report gives flock owners information on prospects for returns from hatching eggs in time to allow them to sell hens on the holiday market if prospects appear unfavorable.

Data for the intentions report come from questionnaires sent to hatcheries and flock owners. From these questionnaires two indications are obtained of the percent change between the number of breeder hens breeders intend to keep during the coming season and the number on hand January 1. These two indications—the C/C and C/H percentages—are plotted on a chart against the Board's final percent change for a series of years.

EGG PRODUCTION

Each month estimates are made of number of layers on hand during the month, rate of lay, and total egg production; total monthly production of eggs is derived by multiplying the average number of layers on farms during the month by the monthly rate of lay per hen. These estimates are published each month in the Crop Production report.

Some of the major problems that must be dealt with in making these estimates are: the continual changes in flock size, variations in rate of lay caused by unseasonable weather, differences between commercial and farm flocks, and changes during the year in number of farms producing eggs.

Changes in flock size result from sale, death, and culling of fowl, and movement of pullets into the flock. The rate of lay has a very pronounced seasonal pattern, but this is often modified markedly by unseasonable weather.

Farm flocks and commercial flocks have different seasonal patterns for both layer numbers and rates of lay. Egg production of each type must be estimated separately then combined for the published estimates. At the beginning of the year a farm flock is considered to be one that has 400 or less birds; this upper limit is gradually decreased to 305 birds in August, then gradually increased from September to December to allow for addition of pullets to the flock. A commercial

flock is considered to be one above this upper limit. Because of the rapid increase in large commercial flocks it has been necessary in some States to divide the commercial segment of the universe into two or more strata.

Since producers move into and out of the chicken business rapidly, the total number of egg-producing farms changes within the year. Therefore, in some months it is necessary to adjust the average per farm holdings by the number of egg-producing farms when estimating the number of layers on hand. Estimates of number of egg-producing farms used in these adjustments are based on data from the census on number of flocks and on current indications in the number of farms keeping poultry from State farm censuses, assessors' data, and special surveys.

Layers in Flock

The number of layers in flocks on January 1 is derived by multiplying the estimated number of all hens and pullets on hand by the percentage of layers in flocks as shown by the Farm Report respondents and commercial egg producers who report on the composition of their flocks as of January 1.

Starting with the estimated number of layers on January 1, the change in number of layers from the first of one month to the first of the next month is estimated from changes shown by per flock averages of layers and C/C indication calculated from reports from commercial egg producers and Farm Report respondents on the first of each month. The indication of layer numbers is calculated by working separate indications for farm flocks and for commercial flocks, and then combining the data for the two universes in order to prepare the overall estimate.

The number of layers on hand during the month is the average of the number on hand the first of the month and the number on hand on the first of the following month. These estimates are kept in their proper perspective by the use of time series charts on which per flock averages are plotted against months of the year to show seasonal change as well as changes from year to year (see fig. 36). Various types of checks or controls are used in estimating layer numbers. For example, hatch and testing data are used as

an indication of pullets added during the month, and data on fowl slaughtered are used as an indication of layers culled.

Rate of Lay

The indicated daily rate of egg production per layer is the number of eggs produced by respondents' flocks on the first day of each month divided by the number of layers in their flocks on that date. Charts similar to those used in arriving at "changes in layers" are used in arriving at "rate of lay on the first of the month." The daily average rate for the month is the average of the rate on the first of the month and the rate on the first of the following month. The rate per layer for the month is the average daily rate multiplied by the number of days in the month.

Revisions in Layers and Rate of Lay

Estimates of the number of layers and rates of lay are reviewed and revised if necessary at the end of each year. Since the January 1 inventory of hens and pullets is used as a base for the monthly estimation of layers, a revision in the January numbers could result in revisions in the monthly series.

COMMERCIAL HATCHERY PRODUCTION

Basic data for hatchery estimates are obtained from weekly and monthly surveys of chick and turkey poult hatcheries. The hatchery universe is all hatcheries that hatch a significant volume of chicks or turkey poults. The weekly surveys

provide data for the monthly hatchery production report as well as the weekly broiler placement report and the weekly report on poults hatched. At the end of the year a complete canvass is made of the hatchery industry to check on total capacity of hatcheries and to obtain data on cross-State movement of egg-type chicks and broiler-type chicks and to obtain reports from those not reporting during the year.

Monthly Hatchery Production

The monthly hatchery production reports feature monthly estimates of number of eggs in incubators and chicks and turkey poults hatched. The chicks hatched and eggs in incubators are broken into two segments (1) broiler type and (2) egg type. The broiler segment shows production of broiler chicks and the egg segment provides a continuous record of the potential supply of replacements for the laying flock. The monthly estimates on turkey poults hatched and eggs set provide a timely record of trends in current turkey production.

Chicks hatched

In estimating chicks hatched monthly, the universe is divided into two groups (1) hatcheries reporting monthly and (2) hatcheries reporting weekly. Two indications are derived from the data reported monthly. One indication compares current hatchings reported by hatcheries with the hatch reported by the same hatcheries in the corresponding month a year earlier. This (current/current) percentage change is applied to the estimate of a year earlier to obtain an indication of the monthly hatch for the current month.

The other indication is based on the relation between number of chicks hatched during the month and total capacity of hatcheries reporting. As the number of chicks hatched per unit of capacity varies with the size of the hatchery, the total operating capacity is established for six size groups within each State. Taking each size group as a unit, the ratio of chicks hatched to total capacity is calculated for hatcheries reporting. These ratios are applied to the total estimated capacity of all hatcheries in the respective size group in order to derive the total number hatched for the group. This procedure assumes that within a certain size group hatcheries that did not

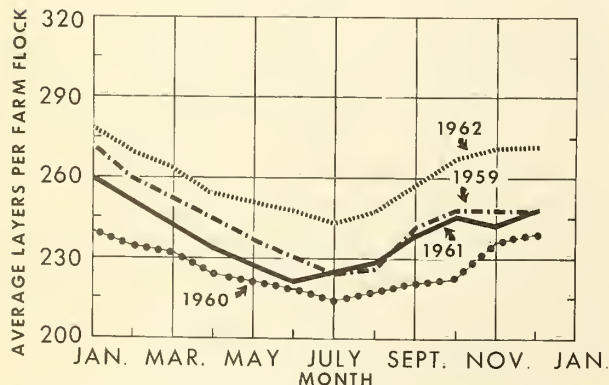


FIGURE 36.—An example of a chart used each month to assist in the preparation of the estimates of the number of layers on farms.

reply to the questionnaire would be operating on approximately the same scale as those hatcheries that did reply. The sum of the six size groups is the indicated total production for the State.

The estimates of eggs in incubators the first of the month are obtained by using a current to current percentage change.

Hatcheries which report weekly are not surveyed again at the end of the month. The weekly reports are converted to a monthly basis by adding the full weeks in the month and parts of a week when a week falls in two months. In cases where a week falls in two months each day of the week is given equal weight. For example if 2 days are in one month and 5 days in the next month, two-sevenths of the weekly production is added to the first month and five-sevenths is added to the second month.

The returns from the hatcheries surveyed weekly are nearly complete. Thus, the estimate for this portion is merely an addition of the reported data plus an allowance for hatcheries not reporting. Eggs set are the number of eggs set as reported for the week in which the first of the month falls.

The total commercial hatch in a State is the sum of the estimates based on monthly reports and the estimates from the weekly reports.

Turkey poults hatched

In estimating turkey poults hatched monthly, States in the weekly poults hatched program (see p. 118) base the estimates on weekly surveys. The weekly estimates are converted to a monthly basis by dividing the weekly data into two parts as was explained in the preceding section on "Chicks Hatched."

For States not in the weekly program, monthly questionnaires are sent to hatcheries. Since coverage of hatcheries is nearly complete, the main indication is based on the addition of the numbers reported with an allowance for hatcheries not returning a questionnaire. Another indication is used which compares current hatchings reported with the hatch reported by the same hatcheries in the corresponding month a year earlier. This (current/current) percentage change is applied to the estimate of a year earlier to obtain an indication of the monthly hatch of the current month.

Broiler Production

The rapid growth in commercial broiler production and the development of specialized broiler breeds created the need for a special reporting program for this industry. The two main reports in the current program are the weekly chick placement estimates and the annual estimate of broiler production. Data for these reports come mostly from weekly and monthly surveys of chick hatcheries.

Broiler chicks placed weekly

Weekly estimates of broiler chicks placed provide a running up-to-date record on developments in broiler production in the various commercial broiler areas of the country.

In making these estimates, questionnaires are sent to all hatcheries producing broiler chicks in the 22 important commercial broiler States. These hatcheries report number of broiler-type eggs set, broiler-type chicks hatched, and placement of chicks by States. As the coverage is more than 90 percent complete, the estimate is merely an addition of the chicks reported as placed plus an allowance for chicks produced in hatcheries not reporting. Data are also collected from truckers and chick dealers showing shipment of chicks into commercial areas. The number of chicks placed in a particular State amounts to broiler chicks produced by hatcheries in the State, plus chicks shipped in, less those shipped out.

Annual broiler production

Estimates of broilers produced during the calendar year are made for all States with significant production. These estimates are published in April of the year following in the annual Farm Production, Disposition, Cash Receipts, and Gross Income report.

Main data for the estimates come from weekly and monthly chick placement reports. The weekly reports are described above. The monthly reports are obtained from hatcheries in States not in the weekly program. An annual survey is also made of hatcheries that report monthly to determine shipments by them to other States. All hatcheries that have not reported during the year are surveyed by mail or personal enumerations to obtain as complete a coverage as possible.

Since only chicks marketed during the year are counted as produced, and since broilers are marketed at an average of 9 weeks of age, estimates are made of the number of chicks placed from late October one year to late October of the next year. From the total number of chicks placed during this period, the estimated total death loss is subtracted to arrive at estimated total number of broilers produced. Death loss figures are obtained from broiler contractors, feed companies, and large producers of broilers. Information on number of young chickens slaughtered (see section on "Poultry Slaughter Report") are used as a check on production estimates. In addition to numbers produced, estimates are also made of the total number of pounds produced, the average price per pound for broilers and gross income.

The number of broilers produced is converted into pounds by multiplying the number of broilers produced by an estimated average weight per bird. The value of this production is figured by multiplying the total pounds by the seasonal average price per pound as received by producers.

Turkey Poult Hatched Weekly

A weekly report on turkey poult hatched is made in six States all year and in four other States from December through June. The first six States are those that hatch predominantly light breeds the year round. The other four States are those that hatch predominantly heavy breeds, for which the hatching season is from December through June.

For the estimates, questionnaires are sent to all hatcheries that produce poults. The hatcheries report number hatched and number of eggs set. Since coverage is nearly complete, the estimates are merely an addition of the numbers reported with an allowance for poults produced in hatcheries not reporting. This report does not take into account shipments from one State to another.

Revisions

At the end of the year an annual survey is made of all hatcheries that did not report during the year. A large number of these hatcheries are enumerated by personal visit or telephone calls to obtain as complete a coverage of all hatcheries as possible. These annual reports along with the

weekly and monthly reports are used as a basis for revising the monthly hatchery estimates of both chickens and poults hatched and eggs in incubators, weekly broiler placement estimates, and the weekly estimates of poults hatched and eggs set.

NUMBER RAISED

Chickens Raised

The estimates of chickens raised or to be raised during the year relate to the laying flock replacements—both pullets and cockerels. Chickens being raised for commercial broiler production are not included in these estimates. These estimates are most useful as an indication of the size of the laying flock during the next calendar year. The first report relating to chickens raised is issued in February on producers' intentions to buy baby chicks or started pullets. This is followed by a midyear estimate of the number of chickens raised or to be raised. A final estimate is made after the end of the year and published in the April release on Farm Production, Disposition, Cash Receipts, and Gross Income.

Intentions to buy baby chicks or started pullets

A report of producers' intentions to buy egg-type chicks and started pullets for replacement flocks during the current season is published annually in the February Crop Production report. This report is useful in forecasting the direction of change and extent of expected purchases. It is published early in the season as a guide to poultrymen in altering their plans to fit changing conditions.

The intentions report shows by geographic areas and for the United States intended purchases of baby chicks or started pullets as a percentage of purchases during the preceding year. The basic data for it are obtained from the February 1 farm report and the commercial egg producers' surveys. Producers are asked to report the number of chicks or started pullets purchased last season and the number they intend to purchase this season. The (current/historic) C/H percent of the previous year is obtained from these surveys and used to make the estimate of producers' intentions to raise replacement pullets the coming year.

Midyear estimate of chickens raised

A separate report of estimates by States, of chickens raised or to be raised during the year for laying flock replacements—both pullets and cockerels—is published in the latter part of July. The estimates help producers formulate their plans for the culling of fowl and for making laying flock replacements.

Data for estimates are based on indications from the June rural carrier survey and the number of egg-type chicks as shown by the monthly commercial hatchery reports. In making the mid-year estimates it is necessary to allow for death loss and number sold or eaten before that date and for the number to be raised after that date. Although chicks hatched for flock replacement are concentrated in the late winter and spring, there is a trend toward hatching a larger portion of the chicks in the summer and fall.

In computing the estimate of chickens raised, the indicated percentage change in number from year to year is applied to the final estimate for the preceding year. The percentage change indication is obtained by interpreting on regression charts the relative changes in the average per flock for number of flocks and identical comparisons. This procedure is similar to that used to estimate poultry inventory on January 1 discussed earlier.

Final estimate

The final estimates for chickens raised are made at the end of the year: these estimates are based on hatchery data, State farm census data, and the level of chicken numbers on January 1, in addition to the indications from the June rural carrier survey. Estimates are also subject to revision after each agricultural census; the census enumeration, however, is not a direct benchmark for these estimates.

Turkeys Raised

Three reports are issued on turkeys raised during a calendar year. Turkeys are considered as raised in the year in which they are marketed. Turkey fryers are marketed at 16 weeks of age or older. Poult hatched for fryers from September of the preceding year through August of the current year would be marketed during the cal-

endar year. This hatching period also fits the annual production of heavy breeds. Practically all heavy breed poult hatched during the first 7 months of the year. The marketing year for heavy breeds coincides with the calendar year.

The first report, published in January, contains estimates of growers' intentions to raise turkeys during the coming year, by States. The second, published in August, is an early season report on turkeys raised and to be raised for the year, by States. The third is the final report for the year published in January of the year following. The first report for the current year and the third report for the preceding year are published together.

For the January estimates of growers' intentions, information is obtained from a January 1 survey of turkey producers. Estimates are computed by plotting reported C/H and C/C percentages on a chart against the Board's final percent change for a series of years.

For the August report, the estimates are based on data obtained from commercial hatcheries on poult hatched from September of the previous year through July of the current year. An estimate of the poult hatch during August is made on the basis of eggs in incubators on August 1 to obtain the poult hatched during the period September through August.

The poult hatched estimates are then adjusted for cross-State movement and exports to arrive at a net placement of hatchery poult for the State. This figure is then adjusted upward to allow for home-hatched poult, then converted to a "raised" basis by subtraction of death losses. Information on death loss is obtained from growers.

For the January report on turkeys raised the estimates are based on the final hatchery estimates of poult hatched from September through August. The poult-hatched estimates are adjusted for cross-State movement of poult, and an allowance for home-hatched poult is added. The number raised is then obtained by deducting death losses. Death losses are based on indications from the January 1 Turkey Survey.

The estimates of turkeys raised are again published as a part of the Turkey Farm Production, Disposition, Cash Receipts, and Gross Income report, issued the first part of April. Estimates of

turkeys raised are also subject to revisions after each Agricultural Census. The census obtains data on numbers raised during the preceding year. Since the census enumeration relates to the entire year no adjustment except for incompleteness is needed in the census data.

POULTRY: PRODUCTION, DISPOSITION, AND INCOME

Estimates of the production of, disposition of, and income from chickens and turkeys are published annually. Included are: estimates by States of the number and pounds live weight of birds produced and sold, cash receipts, gross income, and estimates of death losses.

Estimating poultry production by States is rather involved because of the manner in which chickens and turkeys are raised and marketed. Poultry production comes from the addition to numbers resulting from hatchings and from an increase in weight due to growth. Marketing is continuous and is not always in the State in which the birds were raised.

Estimates of the annual volume of poultry production in each State are developed in several distinct operations. The first involves the January 1 inventories. The ending inventory is subtracted from the beginning inventory to determine the increase or decrease in the number of birds on hand.

The next operation is to determine the number of birds produced and sold during the year. The estimate of the number produced is equivalent to the number raised during the year less death loss of birds that were on hand at the beginning of the year.

The annual death loss of chickens on hand at the beginning of the year is estimated from quarterly returns from reporters showing the number of layers per flock which died during the preceding month. The annual percentage death loss computed from these quarterly returns is applied to numbers of chickens on hand at the beginning of the year to obtain the total number which died during the year. The annual death loss of turkeys is obtained from the January 1 turkey producer inquiry. These losses represent primarily the loss of breeding stock. Young chickens and poults of the current year's hatchings that die are not included in the number raised.

The number of chickens consumed in farm households is based on quarterly returns from reporters showing the number of birds consumed during the preceding month. An annual estimate of the number of birds consumed is obtained by multiplying an estimate of the annual number eaten per farm household by the number of farms keeping chickens.

The number of turkeys consumed in farm households is such a small percentage of production that separate estimates are not shown.

The annual number of chickens sold is the number produced adjusted for inventory changes, less the number consumed in farm households. For turkeys the number consumed in farm households is included in the sales estimates. The estimates of turkeys and chickens sold are checked against available data on commercial slaughter of turkeys and mature chickens. In using data on slaughter of birds, consideration must be given to birds produced in one State and slaughtered in another State.

The next step is the determination of the total pounds of live weight involved for the consumption and sales items. For each series of numbers, a corresponding series of estimated live weights by States is required. The average live weight of chickens sold is estimated from the average weight of young chickens and mature chickens sold during the year as reported by chicken producers and from federally inspected slaughter plants. The average live weight of turkeys sold is estimated from the average weights of turkey hens, toms, and fryer-roasters sold during the year as reported by turkey producers. The weight per bird of fryer-roasters and of total turkeys slaughtered in federally inspected plants is used as check for these average live weight estimates.

The average live weight of birds sold is applied to the increase or decrease in the inventory number to obtain the change in inventory weights. The number of pounds sold is the product of number of birds sold times the average live weight. The weight per bird of chickens consumed in the farm households keeping chickens is based on quarterly surveys from reporters. An annual average weight per bird is estimated which is multiplied by number of birds consumed to obtain pounds consumed in farm households.

Total production of chickens in pounds is obtained by adding the total pounds sold to the total pounds consumed in the farm household, and adjusted by the plus or minus difference between the beginning of the year and end of year inventory live weight. Total production of turkeys is obtained by adjusting the total pounds sold by the difference between the beginning of the year inventory live weight.

The value of production is determined by multiplying the total pounds produced by the weighted annual average price per pound received by farmers. The annual average price per pound is obtained by weighting the monthly prices received by farmers by each month's proportion of the total yearly marketings.

Cash receipts are obtained by applying the annual average price per pound to the total pounds sold. Value of chickens consumed in farm households is obtained by multiplying the annual average price times the total pounds consumed in farm households. Gross income is the sum of the cash receipts and the value of home consumption.

MISCELLANEOUS POULTRY REPORTS

Poultry Slaughter Report

A monthly report covers by classes all poultry slaughtered under Federal inspection and poultry inspected and used in canning and other processed foods. It also includes quantities of poultry condemned under inspection—antemortem and postmortem condemnations. Inspections are shown for young chickens, mature chickens, fryer-roaster turkeys, young turkeys, old turkeys, ducks, and other poultry. All poultry slaughter plants which engage in interstate shipments of dressed poultry are required to be inspected by a Federal inspector. These inspectors submit a report to area offices of the Poultry Division, Agricultural Marketing Service, which in turn forward the data to the division's Washington office. These reports are the basis for the data contained in the monthly poultry slaughter report. Poultry slaughtered in plants not under Federal inspection are not included in this report.

An estimate of total poultry slaughter is pub-

lished each month in the Commercial Livestock Slaughter report. This estimate includes slaughter in both inspected plants and in plants not under Federal inspection. The estimate includes both chickens and turkeys but excludes miscellaneous poultry, such as ducks and geese.

Egg Products

A report issued monthly gives estimated output of all plants breaking eggs. It includes: production and disposition of liquid eggs for immediate consumption, for drying, and for freezing—by class of product; and total production of dried eggs by class of product.

Plants that engage in interstate shipment or fill Government orders are required to have their products inspected by a Federal inspector, who maintains a record of the egg products produced in that plant. These records are used for plants under Federal inspection. Questionnaires are sent to all plants not under Federal inspection who report on the production and disposition of egg products produced in their plants.

Turkeys and Chickens Tested Report

A report issued monthly shows number of breeder turkeys and broiler-type and egg-type chickens tested by official State agencies for pullorum disease. The report provides information on the number of breeder turkeys and chickens available for supplying hatching eggs for turkey poults and broiler-type and egg-type chicks. Each State testing agency submits a report each month showing the number of turkeys and chickens tested. These State returns are the basis for this report.

Pullet Chicks for Broiler Hatching Supply Flocks

A monthly report includes data on the total placements of pullet chicks for broiler breeding flocks by leading primary breeders. This is an enumeration of all commercially important breeders. The report provides an advance indication as to the future supply of eggs available for hatching broiler chicks.

CHAPTER 8. BEES AND HONEY*

When most people think of bees, they think of them as producers of honey. Yet bees are vastly more important as pollinators of many crops, especially fruits and legumes. They are the only pollinators that are commercially controlled by man. Colonies of bees can be moved from one location to another. An increasing awareness of the importance of bees in pollinating crops has been accompanied by a demand for more and more information about the number and location of bee colonies, production per colony, prices received, and value of honey production.

Statistics concerning bees and honey were first issued in 1940. Under the present program the Statistical Reporting Service issues three reports. The first report in July, provides an estimate of the number of colonies on hand, number of colonies lost during the winter and spring, and the condition of nectar plants and colonies. The second, in October, includes estimates of the number of colonies, yield per colony, and production of honey. This report also shows the stocks of honey in producers' hands that are for sale. The third and final report in January gives estimates of number of colonies, yield per colony, and total production for the previous year. Also included in the January report are: wholesale and retail prices received by producers for all honey, comb honey, chunk honey, and extracted honey; stocks of honey in producers' hands as of December 15; beeswax production and price of beeswax.

NUMBER OF COLONIES

In 1940 when the first estimates were established for the number of colonies, they were based on studies of the Census of Agriculture enumerations, State inspection records, estimates by State apiary inspectors and entomologists, and reports from commercial honey buyers and packers. Since then the yearly change in the number of colonies has been based primarily on surveys and State inspection records. No questions relating to the number of colonies of bees

have been asked on the census enumeration since 1950.

Questionnaires are sent to producers for each survey. The number of colonies on hand at the beginning of the honey flow is asked on each questionnaire. The questionnaires are tabulated by size groups based on the number of colonies. Normally the size groups used are: 1 to 9 colonies, 10-39 colonies, and 40 or more colonies. In States with large commercial producers a further breakdown of the large group is made.

The July inquiry asks for the number of colonies on hand a year earlier as well as the current number on hand. These two questions provide an indication of the change in the number of colonies from a year earlier. This indication is referred to as the C/H (current/historic) percent.

The current number reported on the July returns is also matched with the number reported on the July inquiry a year earlier. This provides an indication of change from the previous year called C/C (current/current).

The indications from each size group in the above two procedures are combined by weighting each size group indication by percentages which reflect the portion of the colonies in the universe in each size group. Each of these weighted indications for a series of years is plotted as the independent variable on charts, while the dependent variable is the Board's percent change in number of colonies from the preceding year. (For an example see figure 34.)

In some States data on numbers of colonies inspected are available. Such records are given consideration in making the estimates.

The estimate of number of colonies is again reviewed in connection with both the October and December surveys and revised in December if necessary. Most consideration is given to the July survey since the estimate relates to the number of colonies on hand at the beginning of the

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honey flow, and this date is the closest to the beginning of the flow.

The estimate of colony numbers can also be revised the following July and December. These revisions are based on State inspection records and other data that were not previously available.

HONEY PRODUCTION

The first estimate of the yield of honey per colony is made in October. This estimate is based on the amount of honey producers have already taken and expect to take from the hives.

A final estimate is made in January when producers are asked the amount of honey that was taken from hives during the past year. The total pounds of honey is divided by the sample number of colonies to obtain an average yield per colony. The yields for each size group are then weighted together to compute a State average. The weighting is particularly important because yield per colony increases markedly as the number of colonies increases. This difference is due to better management and the fact that large producers move colonies from one location to another in order to obtain larger yields.

The reported yields are plotted on a chart with Board final yields, which is used currently to determine the yield per colony. The adopted yield per colony is multiplied by the Board estimate of number of colonies to obtain the estimate of total honey produced. These estimates are made by States.

STOCKS OF HONEY

Stocks of honey for sale in producers' hands are estimated and published in both the October and January reports. A percentage indication of honey stocks on hand is derived from the sample by dividing the reported stocks by the reported total honey produced. After the percent of honey on hand for sale is determined for each size group, a weighted percentage is obtained. This weighted percentage is then expanded into a

stocks estimate by multiplying it by the total honey production for the year.

BEESWAX PRODUCTION

An estimate is made in January of the amount of beeswax produced during the last year. The estimate is based on the pounds of beeswax in relation to honey production. A percentage indication of beeswax produced is derived from the sample by dividing the reported pounds of beeswax by reported total honey production. The percentage is then expanded into an estimate of beeswax production by multiplying the total honey production for the year by this percentage.

PRICES

Detailed estimates of prices received by producers for honey were first published in 1940. The questionnaire has been changed several times since, in order to furnish the more comprehensive price data needed when price support legislation for honey was passed. In 1948 the questionnaire was changed to provide a breakdown of both wholesale and retail sales of extracted honey, by size of containers most commonly sold. Sizes included were 60-pound, 5-pound, 1-pound, and "other" containers. In 1959, questions were added to the schedule on prices and quantity of wholesale sales in 55-gallon drums.

The price estimate of all honey sold, published in January, is obtained by combining prices for each size container sold, both wholesale and retail. Estimated quantities of honey sold, by categories for each State, are used in this process to obtain a price for all honey. The quantities used as weights are derived from pounds of honey sold in each category as reported on the questionnaire and from other available sales data. The weights also are used to compute regional and U.S. average prices for wholesale and retail sales of extracted, comb, and chunk or bulk honey, and for all honey.

CHAPTER 9. DAIRY*

Most of the current series of dairy statistics compiled by the Department of Agriculture were started during or after World War I. In 1917 the Department began to collect and publish data on dairy products manufactured in plants. In 1924, a program on collection, analysis, and dissemination of information on milk production, utilization, and income was initiated.

Since then, other statistical series have been added from time to time until today comprehensive series of weekly, monthly, and annual reports relate to most phases of the dairy industry. (See table 6.)

Current dairy statistical series fall into three main categories, namely: (1) Farm production and disposition of milk; (2) uses of milk supplies and prices; and (3) cold storage reports. The last-named category is discussed in chapter 10. The three categories involve different basic sources of information, methods of operation, estimating problems, and users of data.

Most of the survey data relating to farm production and disposition of milk, uses of milk, and prices are collected, summarized, and analyzed in the State offices. The State Statistician makes his report and recommendations to the Washington office, where the data and recommendations are reviewed and the estimates for the various series adapted. The data for cold storage reports and certain of the other reports are collected largely by the Washington office, which is then responsible for making the estimates.

MILK PRODUCTION

Preliminary estimates of milk production are published each month in the Milk Production report. The February issue of this report includes revised monthly production figures for the preceding two years. In February also, estimates of annual average number of milk cows, annual production per cow, and total milk production are published for all States.

Preliminary estimates of milk production are the product of independent estimates of number

of milk cows and average production per cow. As supplemental check data on milk production become available, the estimate of total production is revised, and one or both of the estimated factors are adjusted.

Number of Milk Cows

The level of the estimated number of milk cows in each State is based primarily on the number of milk cows reported each 5 years in the Census of Agriculture. The estimated number is somewhat above the census total, to allow for incompleteness in coverage and in reporting of information. After the estimate has been established for the latest census year, estimates for the 4 years preceding it are revised if necessary to bring them into general agreement with this level, taking into account the various indications of year-to-year change.

Between census enumerations, year-to-year changes in milk cow estimates are based on sample indications from semiannual livestock surveys and semiannual enumerative surveys. Since these surveys provide indications as of June and December, the monthly and annual estimates are keyed to these months. For some States, annual data on milk cow numbers are available from assessment of livestock or a State farm census covering all farms. General procedures for conducting and summarizing these various surveys and analyzing the indications are described in chapters 1 and 2.

A major problem in estimating milk cow numbers is the accelerating trend toward concentration of milk cows in large commercial herds. Large herds may not be properly represented in voluntary returns from rural carrier surveys. Moreover, for indications such as the average number of cows per farm, large herds are responsible for a major part of the sample variance. To maintain better control of the effect of

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TABLE 6.—*Basic Dairy Statistics Available*

Subject	Number on farms	Interstate movement	Production	Farm disposition	Sales	Prices	Fat test	Value of sales	Value of home consumption	Gross income	Value of production	Stocks	Other
Milk cows and dairy products:													
Milk cows.....	X	X				X							
Pasture condition.....													X
Concentrates—feeding rates by kinds and value.....													X
Roughage—feeding rates by kinds.....													X
Milk.....			X	X	X	X	X	X	X	X	X		
For fluid use.....						X	X						
Manufacturing grade.....						X	X						
For specified manufactured products.....						X	X						
Milkfat:													
In milk.....			X										
In farm-separated cream.....					X	X		X					
Fluid dairy products.....					¹ X								
Whole milk products.....					¹ X	² X	X						
Skim milk products.....					¹ X	² X	X						
Milk and cream mixtures.....					¹ X	² X	X						
Fluid cream products.....					¹ X	² X	X					X	
Manufactured dairy products:													
Butter:													
Farm churned.....			X										
Creamery.....			X									X	
Cheese:													
By kinds.....			X									X	
Cottage.....			X										
Dry milk, by kinds.....			X		X	X						X	
Evaporated and condensed milk, by kinds.....			X		X	X						X	
Miscellaneous manufactured dairy products.....			X									X	
Milk equivalents of manufactured products.....			X										

¹ Total sales and per capita consumption by marketing areas.² Home-delivered and store prices by markets.

large herds on the indications, the rural carrier survey data on milk cows are summarized by size of herd. For most States, two size groups are used—herds of 1-49 cows and herds of 50 or more. The average number of milk cows per farm is computed for each size group, and the two averages are weighted together by current estimates of the percentage of herds in each size group. Similarly, percentage changes (current/current) in milk cow numbers are computed for each size group, using current reports matched with those

returned for the same farms a year earlier. The percentage-change indications for the two size groups are weighted together by current estimates of the percentage of milk cows in each group.

Another complication in estimating the number of milk cows is the difficulty of estimating the number of farms with milk cows. This number is affected by two downtrends—one in the number of all farms and another in the percentage of farms keeping milk cows. In making annual estimates of the number of milk cow farms all indi-

cations available are considered. Four of the main ones are:

1. Percentage of all farms reporting milk cows on the monthly Farm Report and, in some States, on the fall rural carrier acreage survey. These percentages are applied to annual estimates of the number of all farms.

2. Percentage of all livestock farms reporting milk cows on rural carrier livestock surveys. These percentages are applied to annual estimates of the number of livestock farms.

3. Expanded number of milk cow farms and indications of annual change from enumerative surveys.

4. For some States, counts of the number of farms with milk cows from an annual assessment of livestock or a State farm census.

The annual estimate of the number of milk cow farms is multiplied by the weighted average number of milk cows per farm from each rural carrier survey to obtain an indication of the number of milk cows for each State.

Enumerative surveys in June and December, covering a carefully controlled area sample, provide additional current indications of milk cow numbers. After several years of research with these surveys, the sample was expanded to operational level in 15 States beginning with the June 1960 survey. These surveys are described in detail in chapter 2. The sample data for each State are summarized to provide the following indications of milk cow numbers in June and December:

1. Direct expansions of numbers of cows in sample segments. Expansions are made by crop reporting districts, which are totaled for the State.

2. Indications of percentage changes in numbers compared with previous surveys. These are based on enumerations in matched segments in the two surveys.

Since indications from enumerative surveys are derived from a probability sample, the sampling error can be computed for each indication. This is an important advantage over voluntary mail surveys which do not provide a probability sample because of selectivity in the returns.

Data from annual assessments of livestock or State farm censuses are usually not available for current estimates of milk cow numbers. However, in many States, these data provide reliable indi-

cations of year-to-year changes which can be used in annual revisions at a later date. The effective dates of these annual enumerations vary by States. To simplify comparison with other indications, the data are considered in relation to estimated milk cow numbers for either June or December.

Each of the various indications of milk cow numbers for June or December can be interpreted on a regression chart such as those described in chapter 2. The regression chart provides a simple graphic comparison of the historical relation between the indication and final estimates which are based on all available data. Another technique, the base-year chart, provides a historical comparison of all available indications of milk cow numbers and final estimates on one chart. For this chart, all indications and estimates are computed as a percentage of a common base point—the date of the last census. Current estimates are plotted on this chart as a percentage of base, which permits giving principal consideration to the indications which provided the most reliable measure of trend in the preceding intercensal period.

Estimated milk cows for December are correlated with January 1 estimates of cows and heifers 2 years old and over kept for milk. The latter series is a segment of the January 1 inventory of all cattle, which is described in chapter 6. The January 1 inventory includes 2-year-old dairy heifers which have not freshened. For purposes of estimating milk production, heifers which have not freshened are excluded from milk cow estimates. Using these definitions, the estimate of milk cows for December in most States is 8 to 12 percent below the corresponding January 1 estimate of cows and heifers 2 years old and over kept for milk. The relation between the two series for each State is based primarily on the relative numbers reported in each category in the December rural carrier livestock survey. The January 1 estimate of milk cows and heifers 2 years old and over kept for milk is also plotted on the base-year chart for comparison with the estimated December number of milk cows.

A simple line chart for each State (fig. 37) is used to record the trend in milk cows in absolute numbers. Tentative estimates of milk cows for June and December are adopted; these estimates

are based on readings of current indications on regression charts and interpretation on the base-year chart. These tentative estimates are plotted on the line chart for comparison with recent trend. When a relatively sharp change is indicated, revisions of estimates for the preceding year are considered, to smooth out the trend.

Estimates of monthly milk cow numbers are plotted on the line chart, following the trend established by estimates for June and December. Estimates of the annual average number of milk cows are computed as a straight average of the monthly numbers.

The estimated annual average number of milk cows for each State remains tentative until it can be reconciled with estimated annual milk production based on check data. When data on plant receipts of milk and cream become available, it is sometimes necessary to modify the milk cow estimates.

Production Per Cow

For purposes of estimating milk production, the rate per cow is based on all milk cows on farms, including dry cows. Milk production per cow in each State follows a seasonal pattern which is a function of many factors, including the percentage of cows being milked, pasture conditions, feeding practices, and extremes in temperature. Because of the seasonal variation in output per cow it is necessary to obtain indications of the rate at frequent intervals through the year, preferably at least once a month.

Survey indications of milk production per cow are computed from questions worded as follows:

1. Cows milked on your farm yesterday-- Number---
2. All milk cows on your farm yesterday-- Number-----
day (both dry and in milk).
3. Total milk produced on your farm Pounds-----
yesterday.
or
Gallons-----

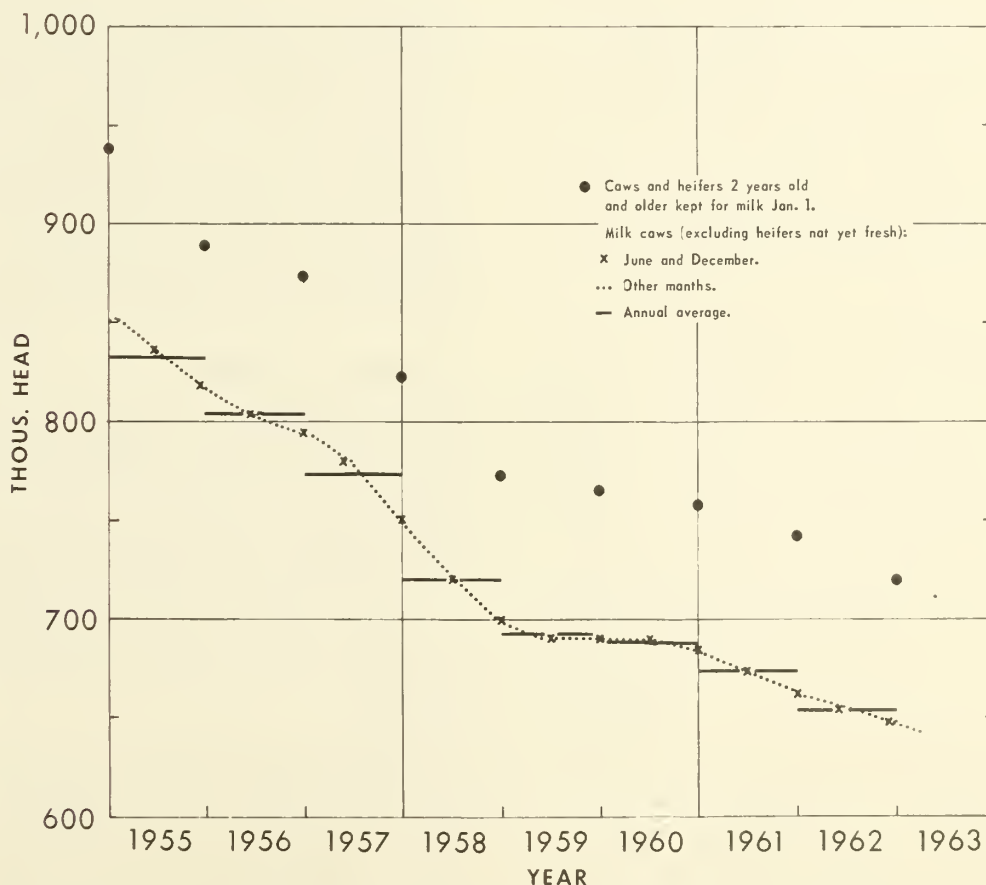


FIGURE 37.—Cows and heifers 2 years old and older and milk cows (excluding heifers not yet fresh), Ohio, 1955-63.

Reporters can answer these simple questions relating to the previous day accurately, without the memory bias which would be involved in questions covering a longer period. Daily average production per cow is computed from these questions by summing up total milk production on a group of reports and dividing this total by the sum of the reported milk cows (in milk or dry). Production reported in gallons is summed separately and converted to pounds. For each State, the reports are usually summarized and rates computed separately by crop reporting districts, or for some surveys, by size groups. The district or size group rates are then weighted together for the State, using weights based on the number of milk cows. The reported number of cows milked is helpful for identifying reports which are apparently in error for all milk cows on the farm. It is also used to compute an average percentage of cows milked for each segment of the sample, for comparison with previous surveys. Since milk production per cow is based on all milk cows (in milk or dry), it is strongly influenced by the percentage of cows milked.

Current survey data on milk production per cow are obtained at the beginning of each month from questions on the Farm Report, which represents all types of farms in each State. In several important dairy States, similar questions are asked on a Milk Production Inquiry which is mailed to a sample of commercial dairymen at the end of each month.

For current indications of monthly milk production per cow, a straight average is computed of the reported daily rates at the beginning and end of the month. This average daily rate for the month is then multiplied by the number of days in the month to provide an indication of the monthly rate. Because of the selectivity inherent in mail returns, the level of production per cow in reporters' herds tends to average higher than for all herds in the State. Adjustment for this selective bias is made by reading the indicated monthly rate from the survey on a regression chart. On these charts, survey indications for the corresponding month in previous years are plotted against final estimates of production per cow which are based on more complete data. For States where an indication is available from a monthly Milk Production Inquiry in addition to the Farm Report, each of these indications is

read on a separate regression chart. These preliminary monthly estimates of milk production per cow may be modified when supplemental check data on milk production indicate that a departure is justified. Various kinds of check data are discussed in the section on total milk production.

Indications of the annual rate of milk production per cow are compiled by adding the 12 monthly rates which were computed from Farm Report indications. Similar annual indications are compiled from the Milk Production Inquiry covering commercial dairy herds. In States where this survey is not made monthly a questionnaire is mailed quarterly to obtain indications of milk production per cow as of February 1, May 1, August 1, and November 1. In most States, data from the Milk Production Inquiry are summarized and weighted by size groups based on the number of milk cows in the herd. This provides a more accurate indication of the rate per cow, with proper representation of various sized herds. Comparable milk production questions are asked in the semiannual rural carrier livestock surveys and the enumerative surveys in June and December. These semiannual indications are adjusted to an annual rate in accordance with the established seasonal pattern of production per cow in each State. Each of these indications of annual milk production per cow is read on a regression chart where it is compared with final estimates.

Total Milk Production

A tentative estimate of total milk production in the month just ended is obtained by multiplying the estimated number of milk cows by the monthly rate per cow indicated by mail survey reports. Using this estimate, percentage changes are computed from estimates for a year earlier and a month earlier. These percentage changes are reviewed in comparison with the trend for other recent months and the usual seasonal change in production.

Supplemental check data on milk production are available monthly for most States, although usually not for the current month being estimated. For example, in early July, when June production is being estimated, the latest check data available are usually for the month of May. Despite this delay, the check data are helpful as

a guide to the level of estimates for recent months compared with a year earlier. The nature and source of available monthly check data vary by States and include the following:

1. Complete data for the State on plant receipts of fluid grade milk from producers, as reported monthly to State regulatory agencies such as milk commissions.

2. Receipts of milk from producers at plants regulated by Federal marketing orders. In some States, these receipts represent a large percentage of all milk produced. In markets which receive milk from several States, receipts are allocated to the States involved.

3. Milk receipts at a sample of plants, comparable with data from the same plants for a year earlier and a month earlier.

4. Estimated production of major manufactured dairy products such as butter and American cheese compared with a year earlier. In several States these products use a large percentage of the total milk production. Since utilization of milk for fluid purposes is relatively stable, changes in milk production are quickly reflected in output of manufactured dairy products. For several important dairy States, current weekly estimates of butter and American cheese production are available as check data shortly after the end of the month. For other States, monthly estimates for these products and for ice cream are available toward the end of the following month.

For each State, the latest monthly check data available are computed as a percentage of a year earlier for comparison with the corresponding percentage change in estimated milk production. For States where the check data cover a large percentage of all milk produced, departure from survey indications of milk cow numbers or production per cow may be justified.

In the review of monthly milk production estimates in the Washington office, a tentative estimate based on survey indications and all available check data is adopted for each State. The resulting total for the United States is compared with monthly check data which are available on a national basis. For the United States as a whole, monthly production estimates are published for several manufactured dairy products in addition

to those mentioned in item 4 above. These estimates, which become available late in the following month, include production of other kinds of cheese, evaporated milk, condensed milk, dry whole milk, ice milk, and creamed cottage cheese. The latest monthly production estimates for each of these products are converted to milk equivalent on a milkfat basis and the combined milk equivalent is compared with the corresponding total a year earlier. For the current month, an approximation of this total is developed from projected estimates of production of each product. When these check data cannot be reconciled with the tentative current estimate of United States milk production, estimates for important dairy States are reconsidered and changes made where they are justified.

In early February, monthly estimates of milk production in each State for the 2 preceding years are open to revision. At that time, the trend of monthly milk cow numbers is reappraised with consideration of indications from the December rural carrier and enumerative surveys and also the latest available data from assessments of livestock or State farm censuses. Monthly and annual milk production estimates for the second year preceding are reviewed to bring them into line with more complete check data on monthly plant receipts of milk and cream from the annual dairy plant survey in each State (Appendix A, exhibit 31). This survey also provides a complete enumeration of production of manufactured dairy products. The data from this plant survey are not available in time for consideration in making the estimates for the year just past. February revisions of monthly milk production estimates for the year just preceding are usually based on less complete check data which became available monthly through the year, after the preliminary monthly estimates were made. For a few States, complete data on monthly plant receipts of milk are available from State agencies or other sources by the following February. Line charts (fig. 38) are used to maintain reasonable relation between monthly estimates of milk production and monthly data on plant receipts of milk.

For the annual revisions in February, tentative estimates are made for each of the 2 preceding years of the quantity of milk sold as whole milk and cream and the quantity used on farms.

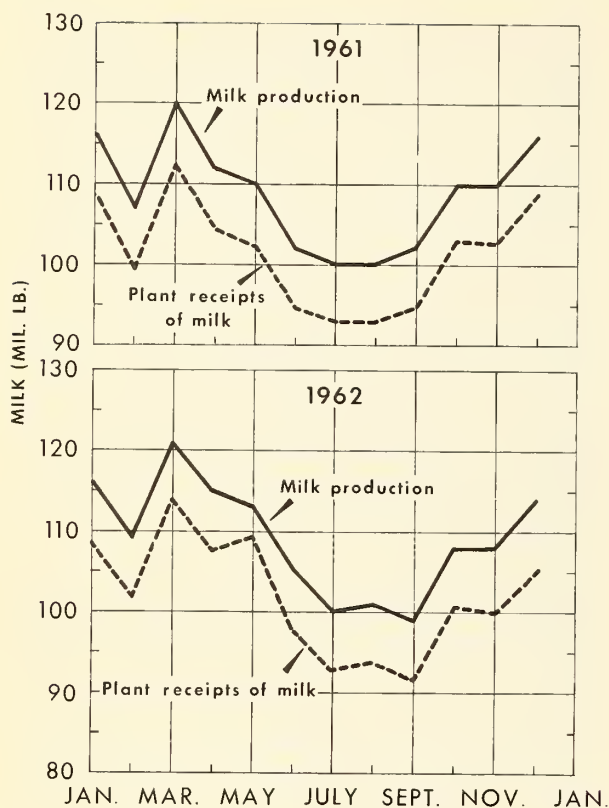


FIGURE 38.—Plant receipts of milk from producers and estimated milk production by months, Florida, 1961 and 1962.

The basis for these estimates is described in the section on farm disposition of milk. The sum of these disposition estimates provides an independent indication of total milk production for each year. This indicated total is divided by the estimated annual average number of milk cows to derive a tentative annual rate per cow. This derived rate is reviewed on the regression charts of survey indications of the annual rate per cow. The adopted annual rate (rounded to 10 pounds) is a reconciliation of the derived rate and chart readings of the survey indications. Estimates of milk production by months are adjusted so that they add to the adopted annual total.

When data become available from a Census of Agriculture, milk production estimates are revised, where necessary, for the 5 years since the preceding census. For most States, total milk production is established in annual revisions, based primarily on plant receipts check data.

However, census data on number of milk cows, number of farms keeping milk cows, and butter churned on farms furnish a basis for revisions in the estimates for milk used on farms. After a census, most of the revisions in total milk production result from changes in estimates for milk fed to calves, used in farm households, and used for farm-churned butter.

Fat Test of Milk

Reports from plants receiving whole milk from producers provide data by months on the average fat test of milk received. These data are reported monthly by a sample of plants, and more complete data are available by months from the annual dairy plant survey. For several States, an indication of the average fat test of fluid grade milk is compiled monthly from reports of the Federal order markets operating in the State. Preliminary estimates of the average fat test of milk sold to plants are published monthly by States in the monthly Agricultural Prices report. Separate estimates of fat test are published for milk eligible for fluid use, manufacturing grade milk, and all milk. After more complete data become available from the annual dairy plant survey, revised monthly estimates are published by States, along with a weighted average fat test for the year.

The trend in the fat test of whole milk sold in each State is used to estimate annual average fat tests for milk separated for sale as cream and for milk used on farms. Estimated fat tests for milk used for these purposes are somewhat higher than for whole milk sold. An estimated fat test for each category of farm disposition, including whole milk sold, is used to compute a weighted annual average fat test for all milk produced. This percentage is applied to estimated milk production to compute annual production of milkfat and milkfat produced per cow.

PASTURE AND FEED STATISTICS

Pasture feed condition and feeding rates for grain and concentrates are important factors affecting milk production per cow. These data are useful in studying short-run changes in milk production by States, because they modify long-time trends in output per cow. Current data on ration values, particularly with relation to milk

and milkfat prices, are widely used as indications of the economic situation in dairy farming.

Pasture Feed Condition

Condition of pastures, reported as a percentage of normal for the date, is published by States as of the first of each month from April to November. The monthly Farm Report asks farmers to report the condition of pasture feed in their locality as a percentage of normal for the date. Although these reports are subjective, they furnish an indication of the current supply of feed available for grazing. Averages of reported condition are computed by counties and by crop reporting districts; these are weighted to obtain State averages. Regional and national averages are computed by weighting the State averages. For the Crop Production report, the weights applied to State averages represent pasture use by all kinds of livestock.

Separate regional and national averages for dairy pastures are computed by weighting the State averages in proportion to use by dairy herds. The averages representing dairy pastures

are published in the monthly Milk Production report. Severe droughts which involve several States may cause a difference of several points between the two national averages of pasture condition, the difference depending on the relative importance of dairying in drought areas.

A map is also published each month showing pasture feed condition across the United States by classes, based on reported percentage of normal (fig. 39). This map is based on county averages of reported pasture condition which are written on a county-outline map of each State. Rough lines are drawn on the State maps in field offices to mark off broad areas with pasture condition within specified percentage ranges. In the Washington office, the lines are transferred from State maps to a large outline map of the United States. Adjustments are often necessary to bring the lines together for adjoining States. For reproduction, areas with similar condition are shaded alike. Since pasture growth quickly reflects changes in soil moisture, the pasture maps also serve as a monthly picture of general growing conditions over the Nation.

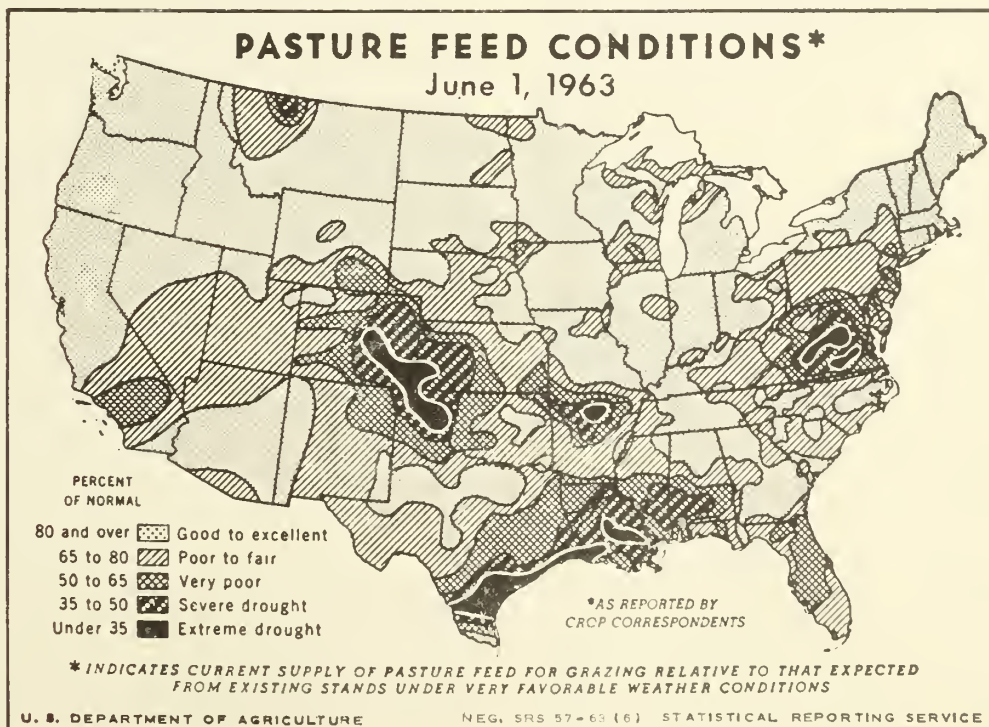


FIGURE 39.—Pasture feed condition, June 1, 1963.

Concentrates and Roughage Fed to Milk Cows

The average amount of grain and other concentrates fed daily per milk cow in reporters' herds is published currently by States at bi-monthly intervals. In alternate months, the Farm Report asks respondents to report the total quantity of grain and concentrates fed to all milk cows on the preceding day. The reported quantities fed are totaled for each crop reporting district and divided by the sum of the milk cows on all reports. The district averages of pounds fed per cow are weighted to a State rate. The computed rate includes grain and concentrates fed to dry cows as well as to the milking herd. The average rate also includes reports showing milk cows but no grain or concentrates fed. These reports usually represent farms where only 1 or 2 cows are kept for home use, although some small commercial herds may receive no concentrates while on good pasture.

Comparable questions on the quantity of grain and other concentrates fed daily are asked quarterly on the Milk Production Inquiry which is mailed to a sample of commercial dairymen in each State. In several important dairy States, comparable data on feeding are collected monthly. For many States, average feeding rates per cow are considerably higher from the Milk Production Inquiry than from the Farm Report, which may not include proper representation of large dairy herds.

Estimated annual feeding rates per cow are based on appraisal of daily rates reported during the year on the Farm Report and the Milk Production Inquiry.

Estimates for each State of the total quantity of grain and concentrates fed to milk cows during the calendar year are based on the estimates of annual feeding rates per cow multiplied by the estimated number of milk cows.

Information on the kinds of grain and concentrates being fed to milk cows is reported by commercial dairymen on the Milk Production Inquiry (Appendix A, exhibit 27). The questionnaires for May 1 and November 1 ask reporters to show the breakdown of total grain and concentrates fed the preceding day by kinds of grain, commercial mixed feed or supplement, and other kinds of concentrates. These data are pub-

lished annually by States in the form of a percentage breakdown of all grain and concentrates fed. On the May 1 and November 1 questionnaires, the quantities of each kind of grain fed are reported as homegrown or purchased. The percentage purchased is published annually by States for each kind of grain, and for the total concentrate ration.

Quantities of specified kinds of hay and silage fed to milk cows during the winter feeding season are reported on the May 1 Milk Production Inquiry. Similar questions on the November 1 inquiry ask for quantities and kinds of hay and silage fed during the summer feeding season, also the quantity of green feed chopped for daily feeding. For each of these surveys, the reported total tons of hay, silage, and green feed are each divided by the number of milk cows on farms where some kind of roughage was reported. The resulting feeding rates for the season for each class of roughage are combined as hay equivalent, considering 3 tons of silage or green feed as equal to 1 ton of hay.

Specified kinds of hay as a percentage of all hay fed during each feeding season are published by States. Similar breakdowns are reported for kinds of silage as a percentage of the total. On the February 1 Milk Production Inquiry, dairymen are asked to report the estimated value per ton of hay being fed to milk cows at that time. The average of these reported values represents a combination of current local prices that dairymen could get for homegrown hay if they were to sell it, together with prices being paid by dairymen who are feeding purchased hay.

Value of Concentrate Rations and Price Ratios

Estimates of the average value per hundredweight of concentrate rations being fed to milk cows are published monthly, by geographic regions. Estimates for each region are based on the average value of concentrate rations as reported quarterly on the Milk Production Inquiry. The reported values per hundredweight include homegrown grains valued at current local prices being received by farmers, and commercial concentrates valued at prices being paid by dairymen. For months between the quarterly surveys, ration values are projected with consideration of

changes in grain and concentrate prices which are reported monthly by grain and feed dealers.

Milk-feed price ratios are published monthly, by geographic regions, to show the current relation between prices being received by farmers for milk and the value of concentrate rations being fed to milk cows. The milk-feed price ratio represents the number of pounds of concentrate rations equal in value to 1 pound of milk sold by farmers to plants. Ratios are computed by dividing the estimated current price per hundredweight received by farmers for all milk by the estimated value of concentrate rations per hundredweight. For use in computing the United States milk-feed ratio, an average value of concentrate rations in milk-selling areas is computed by weighting regional ration values by the quantity of whole milk sold to plants. Estimates of the value of concentrate rations and milk-feed price ratios are published by months for each State once a year.

Milkfat-feed price ratios are published monthly by regions to show the relation between prices being received by farmers for milkfat in farm-separated cream and ration values. The milkfat-feed price ratio represents the number of pounds of concentrate rations equal in value to 1 pound of milkfat in cream sold by farmers. The milkfat-feed price ratio for the United States is based on an average value of concentrate rations computed for cream-selling areas.

FARM DISPOSITION OF MILK AND INCOME FROM DAIRY PRODUCTS

Annual estimates are made for each State of the farm disposition of all milk produced. This includes separate estimates of milk fed to calves, used in farm households, used for farm-churned butter, sold as whole milk to plants, separated for sale as cream to plants, and retailed by farmers. The farm value of all milk produced is developed from these disposition estimates, using annual average prices.

Milk Used on Farms

Estimates of milk used on farms for various purposes are based primarily on indications from disposition questions on the Milk Production Inquiry (Appendix A, exhibit 28). On February 1 and August 1 this questionnaire asks for the quantity of milk from the previous day's production

which was fed to calves, used in the farm household, and used for farm-churned butter. The quantities reported in these questions are computed as a percentage of all milk produced on the farms reporting. Separate percentages are computed by size-groups based on size of herd, and these percentages are weighted by the indicated total milk produced in each size group. This weighting adjusts for the tendency of the Milk Production Inquiry to overrepresent larger commercial herds. A much larger percentage of the total milk is used on the farm on which only a few cows are kept primarily for home use.

Estimates of milk fed to calves are based primarily on the weighted percentage reported for this use on the Milk Production Inquiry. The average of these percentages for February 1 and August 1 is applied to the estimate of annual milk production for each State. Milk sucked by calves is not included in the estimate of milk fed to calves or in total milk production.

Estimates of the quantity of milk used in farm households in each State are the product of estimated population on farms keeping milk cows and estimated consumption per person of milk produced on the farm. Farm consumption of milk purchased from commercial sources is excluded from these estimates. On February 1 and August 1 the Milk Production Inquiry asks for the number of people living on the farm, including families of hired help unless they are using milk from other sources. The average number of people per farm from this question is applied to the estimated number of milk cow farms which is described in the section on milk cow numbers. This provides an estimate of population on farms with milk cows. Daily consumption per person of milk produced on the farm is also computed from the reports on the Milk Production Inquiry. This daily rate is converted to an annual rate per person and applied to the estimated population on milk cow farms for an indication of total quantity of milk used. This procedure uses an independent estimate of the number of farms keeping milk cows, which is the most rapidly changing factor affecting the total quantity of home-produced milk consumed in farm households.

Separate estimates are made of milk used for farm-churned butter. Farm churning of butter

has declined to a negligible level in a large part of the country but still accounts for a significant percentage of total milk production in areas of the Southern States where small herds are prevalent. Census questionnaires for most Southern States ask for the quantity of farm butter made during the week preceding the enumeration. This reported quantity is adjusted to an annual basis and is used to establish the level of annual estimates. Questions on production of farm-churned butter are asked monthly on the Farm Report in Southern States and annually in other States. These data are used as the basis for annual estimates of the quantity of butter churned on farms, which are then converted to milk equivalent on a milkfat basis.

Whole Milk and Cream Sold to Plants

Estimates of the quantity of whole milk sold to plants are based primarily on receipts reported in the annual survey of dairy plants in each State (Appendix A, exhibit 31). In States where these reports are not required by law from all plants receiving milk, an allowance is made for incompleteness in coverage. For some States, more complete data on receipts of fluid grade milk are available from required monthly reports to a State regulatory agency or to administrators of Federal marketing orders. In April, when preliminary estimates of milk sold to plants are published for the preceding year, receipts data are not available for all States from the annual plant survey. Where complete survey data are not yet available, preliminary estimates of milk sold to plants are based on the percentage change from a year earlier in comparable data. In important dairy manufacturing States where little farm-separated cream is sold, the milk equivalent of estimated production of major manufactured dairy products furnishes an indication of the percentage change in whole milk sold to plants. Preliminary estimates are revised if necessary in the disposition report a year later, when more complete data are available on plant receipts.

Annual dairy plant surveys are also the principal source of data on receipts of milkfat in farm-separated cream. Receipts reported as pounds of fat are converted to milk equivalent, using the average fat test of manufacturing grade milk in the State. For some States, data on plant

receipts of farm-separated cream are not as complete as for whole milk receipts. Sales of milkfat in cream reported by producers in the Census of Agriculture provide a check on the level of cream sales.

Milk Retailed by Farmers

Estimates of milk retailed by farmers represent milk from producers' own herds which is sold directly to consumers, at the farm or on retail routes. The estimates include small quantities of milk sold to neighbors, as well as milk which is marketed by producer-distributors from their own herds. Milk produced in herds kept by public and private institutions is also included in this category.

Questions on the Milk Production Inquiry on February 1 and August 1 provide an indication of milk sold directly to consumers as a percentage of all milk produced. In several States, regulatory agencies such as milk commissions require reports from producer-distributors on milk sold from their own herds. In Federal order markets, milk produced by a handler's own herd is included in total producer receipts for the market if the handler also buys milk from other producers. However, separate data are available for some of these markets on sales by producers who retail only milk produced by their own herd and are not regulated by the order.

Farm Income From Dairy Products

Separate estimates are made of cash receipts from each segment of sales by farmers: whole milk sold to plants, cream sold to plants, and milk retailed by farmers. Annual average prices received by farmers are estimated by States for each of these segments. Estimated prices for each segment are in terms of the prevailing unit of sale: per hundredweight for milk sold to plants, per pound of fat for cream sold to plants, and per quart for milk retailed by farmers. Estimated annual sales are expressed in these units and multiplied by annual average prices to obtain cash receipts from each method of marketing.

Total cash receipts from farm marketings of milk and cream are the sum of receipts computed for each segment of sales. This total is divided by the total quantity of milk represented in products sold, to derive an annual average return per

hundredweight of milk for all methods of sale. This average return is used to evaluate estimated quantities of milk used in farm households and used for farm-churned butter. The value of milk used for these purposes is added to cash receipts from marketings to obtain the estimate of gross farm income from dairy products. The average return per hundredweight from combined marketings is also applied to total milk production to compute the farm value of all milk produced. This estimate includes the value of milk fed calves in addition to gross farm income from dairy products.

UTILIZATION, PRICES OF MILK, AND RELATED STATISTICS

Milk for Fluid Purposes

Two-thirds of the milk received from farmers by plants and dealers is eligible for fluid use. This is the milk that meets sanitation standards for cities and States and, where applicable, the U. S. Public Health Service standards for Grade A milk. Largely because of historical differences between these standards, statistics for the fluid milk industry have been developed differently from statistics for other portions of the dairy industry.

Traditionally, the fluid milk industry has been organized into individual city markets. Early attempts at data collection were the publication of prices by individual markets. Later, plant receipts and sales of milk in certain markets were tabulated. This method of showing changes in utilization worked fairly well in cities with stable populations where each dealer sold milk in only one city. However, meaningful utilization data were almost impossible to obtain in rapidly growing areas and in markets where dealers were expanding into nearby markets.

The most important improvement in fluid milk and cream statistics occurred in the early 1940's when useful data became available from State and Federal regulatory programs. These programs had their beginnings in price legislation passed in the early 1930's. A number of States set up milk control agencies at that time, and the Agricultural Adjustment Act of 1933 became the basis for the Federal Milk Marketing Order program. Since the 1940's—particularly in the late

1950's—the expansion of the Federal program has provided data for an increasing number of markets. Also, in recent years, several State milk control agencies have instituted statistical programs as part of their regulatory procedures, and these have resulted in greater statistical coverage.

Today, State and Federal regulatory programs are still the most important sources of fluid milk and cream statistics. In 1963, sales data were available for marketing areas under regulatory programs that represented 65 to 70 percent of the country's nonfarm population. The utilization and sales data reported by milk handlers are audited by the administrative agencies. Movement of producer milk from one plant to another is accounted for, and impartial administrators are in a good position to make sure that sales data are accurate.

Recent developments in the Federal statistical program on receipts and sales of fluid products have included the standardization of data from various sources. Also, significant improvement in the kinds and quality of data has been made. Under the Federal order program, increased geographic coverage has followed the growth of the regulatory program. More complete tabulating and editing procedures have resulted in more practical data for several purposes. Additional products have been tabulated separately where significant differences have been noted. Market administrators have also provided more useful producer receipts data; several are now supplying current monthly receipts by State-of-origin. Others tabulate receipts or numbers of producers by States for one or two months of the year or compile totals after the end of the year.

Receipts and Sales of Fluid Products by Markets

Receipts and sales of fluid milk products are published on a monthly basis in the Fluid Milk and Cream Report. Data are for State and Federal order areas.

Of the six State areas used, four prepare data for the whole State; these four are California, New Jersey, North Carolina, and South Carolina. New York has two State order areas, each of which consists of only a small part of the State. Mississippi has four State order areas geographically comparable with Federal order areas and

one area under State control but not under Federal regulation.

Data for the individual Federal order areas are compiled by the Market administrators. Data for the State order areas are the product of statistical programs developed by State milk control agencies.

Receipts.—Receipts data published each month are for the second month preceding publication date. All of the State order areas listed above are included except California.

Data for New Jersey, North Carolina, South Carolina, and Mississippi are total milk receipts from Grade A herds. The data for New Jersey and the Carolinas are adjusted for interstate movement from agency records. For Mississippi, allowance is made for interstate movement when the State total is prepared by the Mississippi Milk Commission in cooperation with Federal administrators in marketing areas of the State and in marketing areas nearby.

Sales.—Sales data published each month are for the third month preceding publication date. Although sales data are available for 12 individual products in most markets, current totals for only the following product groups are published each month: Whole milk products, skim milk products, milk and cream mixtures, other fluid cream products, and total fluid products. Annual figures for individual products are published separately for the purpose of consumption analysis.

For all the federally regulated areas (where data are used in sales comparisons) and Niagara and Rochester, New York, sales data represent only those sales made within each defined marketing area. For the four entire States under State regulation, data are tailored to include milk moving into the State and to exclude sales moving out; this is done from information required by the State milk control agency.

The collection of sales data for specific geographic areas is considered essential for the measurement of sales and consumption trends. In nearly every market, sales patterns of individual dealers vary considerably. Some of the larger dealers have aggressive sales policies and their routes often extend for some distance from the city plant. Other dealers may lose sales rapidly in one community while perhaps gaining in

another. Only by compiling total sales data for a specific area can individual dealer gains and losses be balanced to indicate the trend for the area. Sales data from 76 of the 83 Federal areas are used in current sales comparisons. Only those areas having adequate "in-area" sales data available for two entire years appear in the sales tables.

In several other States that have no Federal marketing areas but that do have a State milk control agency, statistical programs are under consideration. There has also been some discussion of ways of expanding coverage to include geographic areas not under regulation and of ways to obtain Statewide coverage in more States.

Fluid milk and cream sales data are presented in two ways. First, sales are measured in terms of individual products sold and the milkfat contained in each product. This method is useful for many purposes but the actual quantities of cream sold do not adequately represent producer milk. In order to account for whole milk, skim milk, and cream in common terms (fat usage), the data are also shown as milk equivalents. The milk equivalent of sales is the quantity of producer milk at average milkfat test required to supply the milkfat used in the products sold. As an example, 300 pounds of cream having 18 percent milkfat is equivalent to 1,500 pounds of producer milk with an average milkfat test of 3.6 percent:

$$300 \times 0.18 = 54 \text{ pounds of milkfat}$$

$$54 \div 0.036 = 1,500 \text{ pounds of milk equivalent}$$

Total utilization of milk, when compared with production, is usually expressed in milk-equivalent terms.

Fluid Milk and Cream Consumption

Estimates of per capita fluid milk and cream consumption are made for the United States and for certain market areas.

For the market area per capita estimates, it is necessary to first compute the population of each marketing area. Since the sales data used are annual and since population changes continuously, an average population figure for the year is needed. Population converted to a July 1 date has been found to closely approximate an annual average.

The first step in making estimates of marketing area populations is to prepare a July 1 benchmark figure for each area for the latest census year, in this case 1960. April 1, 1960, populations for all or a portion of each town, township, or other minor civil division in each marketing area are tabulated from published census data. Next, tabulations of April 1, 1950, populations (the previous population census) for the identical marketing areas are made, and an annual average difference calculated. The April 1, 1960, data are then adjusted to a July 1, 1960, date by adding approximately one-fourth the yearly difference.

Annual estimates for succeeding years are projected forward from two indications. The first is the annual average difference for the previous decade. A second indication is a population estimate from county and city estimates of population made by State and local agencies. These estimates are published in a number of States and are usually adjusted to a July 1 date. Although all agencies within States do not use the same method of preparing estimates, the procedures have a fair degree of uniformity. Available local data are assessed for adequacy before they are used. In general, the local estimates are accepted if the birth and death statistics are corrected for in-migration and out-migration for each individual county and important city. This adjustment is especially needed where there have been considerable economic or other social changes in an area.

Consumption by marketing areas

After the population estimates have been made for each marketing area, the annual sales data are divided by the population estimates to arrive at annual per capita rates of consumption. Areas are used only after "in area" sales data have been available for a two-year comparison. These are published by marketing area for the first and second preceding years in the May issue of the Fluid Milk and Cream Report.

Per capita rates of consumption are calculated and published for 12 individual products in each marketing area where the data are available—80 areas in May 1964. Annual sales and milkfat test for each product are also published as a basis for the computation. The whole milk items are plain and flavored whole milk, and yogurt. Skim

milk items are plain, skim milk solids added, flavored skim, and buttermilk; the newly developed 2 percent product is classified as either plain skim milk or skim milk solids added. Cream items are: mixtures (half and half), eggnog, and light, sour, and heavy cream. For type-of-product comparisons, whole and skim products are totaled as another measure; and the milk equivalents of both all cream items and all fluid products are prepared for each marketing area.

Consumption for the United States

Estimates of total consumption of fluid milk and cream products (in terms of milk equivalent) for the United States have been prepared for the years since 1924. Before World War II, these estimates were based primarily on consumption of milk and cream reported by local Boards of Health. This series was revised after sales information for 1944 became available from wartime records. In recent years, more reliance has been placed on per capita rates for individual markets in the estimation of per capita consumption for the United States. Because certain geographic areas are not covered by either Federal or State agencies, the current consumption estimates for the United States are still related to the earlier series.¹

Fluid Milk and Cream Market Prices

Prices in about 160 markets are published each month in the Fluid Milk and Cream Report. These are generally obtained from a questionnaire sent to from one to three respondents in each market (Appendix A, exhibits 29 and 30). Reporters are usually milk distributors or other persons closely connected with the trade. In some cases, State Statisticians or milk marketing officials provide the data. Minimum prices under State or Federal regulation, where they are effective prices, are quotations from official records.

Published prices are the latest reported during the first 10 days of each month; most respondents,

¹ For a more complete discussion of the procedure see Herrmann, Louis F., Haynes, Lawrence W., Adams, Keister, and Rojko, A. S., "Estimating Statistics of Milk Consumption in Relation to Trends in Fluid Milk Marketing," ERS-70, Econ. Res. Serv., U.S. Dept. of Agr., May 1962.

however, report the information as of the first of the month or when a price change occurs. If reports are not returned in time for publication, respondents may be queried by telephone or other rapid means of communication.

Each distributor who reports is asked to report not only the prices with which he is familiar in his own operation but prices for the entire market. Where there is considerable variation in the prices in a market area (usually at the consumer level) the reporter is instructed to use those that represent the major portion of sales in the market. The prices quoted usually represent judgments by reporters and may vary with individual reporters; however, an effort is made to keep quotations comparable from market to market.

Dealers' buying prices for milk and cream for fluid use

Dealers' buying prices for each of approximately 160 markets are published each month. These prices are those paid for milk used for fluid purposes regardless of classification. Most markets have a classified plan whereby the milk which is eligible for fluid use is given a class based on its final use. In several markets (mostly those without State or Federal regulation) milk is not classified, and an average or flat price is paid. In classified markets, fluid use milk (most often known as Class I) receives the highest price. For many of these markets, prices quoted for this usage are minimum prices established under Federal orders or by State milk control agencies. In a number of Federal order markets, producer associations have negotiated premiums higher than Federal order minimums. Also, in a few States, State minimum prices may at times be higher than Federal order minimums. In each case the effective price is quoted.

Dealers' buying prices are also quoted on a comparable basis as to milkfat content for each market. Most market quotations are for a basic milkfat test together with a specified fat differential (for example, \$5.00 per hundredweight for milk containing 3.5 percent, with a milkfat differential of 7.2 cents).

Average dealers' buying prices of milk for fluid use, on a 3.5 percent milkfat basis, are shown by regions and for the United States in a special table each month. The regional and

U.S. averages are computed by weighting available market prices by the estimated population (in the absence of receipts data for all areas) in each market.

In many markets, milk used for fluid cream is paid for at fluid milk prices, but in some markets it is given a special classification and priced separately. In still other markets, milk used for cream is priced at the same rate as milk used for other than fluid purposes. Because of these differences, these quotations are shown separately each month in the Fluid Milk and Cream Report.

Most price quotations have traditionally been for milk received in milk cans from producers. Use of bulk tanks in recent years has resulted in payments of premiums to those producers having tanks. These premiums are quoted in a special table of the report, but not included in dealers' buying prices. Other premiums for special reasons or services are also quoted in this report from time to time.

Blend prices to producers

As mentioned previously, milk in classified markets is priced according to usage. Higher prices, in most instances Class I prices, are paid for the milk classified for fluid use. Lower prices, usually Class II, are paid for milk used in butter, nonfat dry milk, ice cream, cheese, and other products. Producers receive blend prices or the average price of milk used in each class.

Minimum prices for each class or usage are established in Federal order markets and in most markets under State milk control. Because of higher than minimum prices for Class I milk in many markets the resulting blend prices paid to producers are often higher than the blend price calculated at minimum levels. Altogether during 1963, there were 32 marketing areas with higher than Federal minimum Class I prices in one or more months of the year. A special table in the Fluid Milk and Cream Report is prepared each month to show Class I prices, including negotiated premiums, blend prices at minimum order levels, and blend prices including premiums over Class I minimum prices where they occur. Prices paid to producers in several States under State milk control are also published in this table. In addition, the table shows blend prices received by

members of producer associations in some unregulated markets.

Home and store prices

Prices vary considerably between markets as a result of many forces. Contributing to this variability are the different ways in which milk is offered to the public. More sizes and types of containers are now available. Dealers almost everywhere now give consumers the choice of milk in quarts and half-gallons in both paper and glass at homes or in stores. Glass gallon containers are used in a majority of markets; the newest development is the paper gallon. Different types of whole milk are also offered—milks with varying percentages of fat, milk that has been homogenized, and milks to which certain nutrients, principally vitamins and minerals, have been added.

This variability of prices complicates the reporting problem. In a number of markets, only a range of prices can be reported for a particular grade by container size. In others, one price is fairly common. The most recent concept is to quote the price for the "the most common grade." This price is intended to represent the price or narrow range of prices covering the major portion of the milk in the market.

Table 1 of the Fluid Milk and Cream Report carries prices for the "most common grade" of whole milk in the three container sizes for both home delivery and at stores. In most markets this is HVD, homogenized whole milk with vitamin-D added, but there are exceptions. Prices of home delivered milk are quoted in quarts, half-gallons, and gallons in glass containers (glass is "most common" for home delivery in most markets). Also on home delivery routes, the "most common" discount for quantity delivery, where such discounts are effective and reported, are shown.

Prices of special grades of whole milk and of cream items are published for 40 of the 160 markets. Prices are given for homogenized vitamin-D milk with minerals added, high fat (Guernsey and Jersey) milk, certified milk, half-and-half, table cream, and whipping cream.

Prices for creamed cottage cheese are also published each month for the 40-market group. Quotations are for pound packages, 12-ounce pack-

ages, and other-size packages, both delivered to homes and sold out of stores.

Manufactured Dairy Products

Statistics on manufactured dairy products—butter; cheese; evaporated, condensed, and dry milk products; and frozen products—are prepared from information supplied by primary dairy processing plants. These statistics include: quantities produced, prices and test of milk used, manufacturers' prices, stocks, and sales for some products.

Approximately 42,000 establishments manufacture dairy products in the United States. Of these, about 9,000 are "regular" plants that produce primarily for wholesale distribution. The other 33,000 are mostly retail establishments that make frozen products from purchased mix.

Statistics on manufactured dairy products are used by manufacturers, distributors, consumers, machinery companies, Government agencies, and others who keep in touch with production trends and areas, market supplies, prices received by producers, utilization of milk, sugar allocations for frozen products, and other economic aspects of the dairy industry.

Enumeration of production of manufactured dairy products

In the enumeration (complete annual survey) of dairy plants, production data are obtained for all the important manufactured dairy products, such as creamery butter, the principal kinds of cheese, various types of evaporated and condensed milk products, several kinds of dry milk products, and major types of frozen products, such as ice cream, ice milk, sherbet, and Mellorine. Data are also obtained for water ices because they are competitive with dairy products and usually are made in dairy plants. Items covered are shown in detail in the sample reporting form in Appendix A, exhibit 31. Data are obtained from the plants on a monthly basis, although the questionnaire may be collected at annual, quarterly, or monthly intervals.

A complete list of all dairy plants in the United States which produce any manufactured dairy products is maintained by the Statistical Reporting Service. A majority of the SRS State-

Federal offices also maintain complete lists of dairy plants. Each plant is assigned a code number for identification purposes. A typical code number—34-1234-77—identifies the plant as follows:

34—Ohio (State)

1234—Jones Creamery, Akron, Ohio

77—Summit (County)

A plant keeps its code number regardless of changes in ownership. A card file is kept of all active plants. The cards show names, addresses, and principal products made by plants. Records of all dairy plants licensed under State laws are the primary source of information used in maintaining a complete list. Most State licensing agencies maintain such a list and make it available to the field office or to Washington. Dairy magazines and periodicals are also reviewed to obtain names of new plants going into operation.

Collection of the questionnaires from the individual plants is handled partly through the State offices and partly through the Washington, D.C., office. In 33 States, Federal and State efforts are combined through the use of a joint questionnaire. In most of these States, State laws provide for collection of the statistics as a part of the State dairy plant licensing system. Such laws are helpful in obtaining complete returns. In cooperating States the Federal-State statistician may handle the collection and tabulation of dairy plant statistics directly or he may assist other State officials. For 15 States and the District of Columbia, dairy plant data are collected by questionnaires mailed direct from the Washington, D.C., office. Generally the questionnaires are mailed to plants in window envelopes with the name and address of the plant stamped directly on the questionnaire. This is helpful in identifying the returned reports. Constant diligence and numerous follow-ups are necessary to obtain a complete coverage of all dairy manufacturing plants.

A typical collection procedure is that of the Wisconsin office, which uses both an annual and a monthly questionnaire; the annual questionnaire has spaces for reporting monthly totals.

The monthly questionnaires are sent to a sample group of manufacturing plants. Data from them are used in making current estimates, which are

supplied by the State office to the Chicago Dairy Statistics office.

The annual questionnaire is sent out shortly after the end of the year to each dairy plant in the State from which no monthly questionnaires have been received. When the completed annual questionnaire is returned it is checked against the plant's record card to determine whether the questionnaire has been completely and accurately filled out. Usually the questionnaire is also compared directly with the questionnaire for the same plant in the preceding year. A reminder card is sent to plants that have not returned the questionnaire within a few weeks. If necessary, a second follow-up is sent in the form of another questionnaire to be filled out and returned. Registered letters or telegrams usually are sent as a final reminder. Usually by the time the final reminder is sent reports have been received from all but about 25 or 30 of the 2,300 plants in Wisconsin.

Most cooperating States have a law which requires the plants to report the dairy statistics that the cooperating State agency requires. In some States, State dairy inspectors enforce reporting procedures, and delinquent reports are referred to them. During regular inspections of the plants attention is called to the statistics inquiry and a report is obtained on quantities of products made. Personnel from the State Statistician's office visit the delinquent plant and obtain the data when it is convenient.

When State laws are not in force to assist in the collection of these statistics it is sometimes possible to get the delinquent reports by telephoning the plant manager or at times having a representative of the State office make a personal visit. Occasionally the plant operator may refuse to report. If it can be determined that the plant operated at any time during the year, an estimate is made of the volume of products manufactured: the estimate is based on reports for other years and other general information.

Frequently, reports are incomplete or inaccurate. If a plant makes a large quantity of butter in one year and reports none the next, a letter is usually sent to the plant operator requesting verification. Sometimes a plant operator does not fully understand a question. Again, obvious errors are made, such as reporting ice cream in terms of pounds rather than gallons, misplacing

a decimal point, or showing the wrong number of ciphers. Frequently, errors of these types are detected by comparing the current report with the one submitted for the previous year, and the necessary adjustments are made.

Data for States without cooperative agreements are tabulated in the Washington, D.C., office. Data are tabulated by months for each commodity. When only annual totals are reported by plants these annual totals are prorated by months according to the monthly totals reported by other plants, on a commodity and State basis.

In all cooperating States, data relating to the production of manufactured dairy products are tabulated on a commodity basis. For example, a listing sheet is set up for butter with columns for each month and an annual total. To be sure no plant is omitted in the tabulation, identifying numbers or names of all plants reporting in the preceding year have been previously recorded on the listing sheets, and those plants which have discontinued production are so marked. Within the State, the plants are usually arranged by crop reporting districts and counties. After the reports for all plants in the State are posted on the listing sheets, the data are visually inspected to be sure the figures are reasonable and are consistent with the reports from other years. When all plant data are posted to the listing sheets the totals are computed and also entered on the listing sheets. From these listing sheets the totals for the State, including the number of plants, are transferred to a State summary sheet.

When the State tabulations have been completed, the summaries and the listing sheets are forwarded to Washington, where they are reviewed or spot-checked for errors of omission. Since many plants report on a monthly basis to the Washington, D.C., or Chicago office, the data that have been reported monthly to these offices are sent to the State in order to be certain that the reports of these plants are consistent. If there are large differences, the data are checked with the plants to determine which of the information reported is correct. After all State reports have been summarized, statistical tables giving State, regional, and national totals are prepared and published in Washington. In publication, care is taken not to divulge the individual operations of any plant or firm.

Some special considerations are involved in enumeration of the 33,000 establishments that make frozen products mostly from purchased mix for retail distribution. These are generally referred to as "counterfreezers" because most of them originally froze their products in a batch-type freezer mounted on a counter.

Data for the counterfreezers are generally obtained through an annual questionnaire which asks for the quantity of mix used and has a space for the operator to check whether the product made is a soft or hard product. Soft frozen products are defined as products sold directly from the freezer or kept in a hardening room or cabinet for less than 12 hours. The entire production of a particular product by a plant is classified as soft if most of the product is sold soft. Most soft frozen dairy products are sold from direct serve, soft serve, or shake machines, from which the product is drawn into a cup or cone and sold directly to the consumer.

Use of another innovation—the mobile freezer-dispenser—has grown rapidly in recent years; this is a freezer on a truck which tours the streets selling frozen products in cones or cups, sundaes, and so forth. It is usually required that these units be cleaned at a central depot once every 24 hours, and it is through these depots that information about the units can be obtained. Since most of these mobile units are franchised, data may also be obtained from the franchising headquarters.

As counterfreezers are generally small, many such establishments are easily moved. Also their business is often highly seasonal. It may be difficult to find the owners unless there is a rather strict State licensing provision. Coverage of these counterfreezer units varies from State to State according to the stringency of licensing provisions and the laws of the State. In some States, counterfreezer data are obtained through questions inserted on the licensing application of the State Department of Agriculture or State Department of Health. In several States all of these units report, but in others, particularly those without cooperative agreements, as many as one-fourth may not report. Production of the total group is therefore obtained on the basis of a total for reporting plants and an estimate for nonreport-

ing plants believed to be in operation. This estimate is based on the number of plants listed or licensed but not reporting, indications of the proportion not producing in the current year, and an adjusted or assumed average amount made by nonreporters.

Only annual production of counterfreezers is enumerated. Monthly totals for ice milk are calculated from the reported monthly production of ice milk mix. In order to estimate the monthly output of hard and soft ice milk separately of these counterfreezer reports, the mix required for making hard frozen ice milk is subtracted from total ice milk mix and the residual is used as an indication of the monthly production of soft ice milk. Monthly totals for other frozen products made by counterfreezers are generally obtained by using the seasonality shown by regular plants for the respective product. Usually the production of ice cream by counterfreezers represents an extremely small percentage of the total output of ice cream for a State, but counterfreezers may produce a substantial proportion of the total ice milk made in the State. Most counterfreezers produce and sell only soft-frozen ice milk although some do sell several other products including hard-frozen items.

Current estimates of production of manufactured dairy products

Since there is an appreciable time lag between the collection and publication of the complete annual survey or enumeration, current data on production of factory dairy products are provided by a series of monthly and weekly estimates of all the important products. Estimates of creamery butter, cheese, ice cream, sherbet, Mellorine, water ices, and cottage cheese are handled in the Chicago Dairy Statistics Office. Estimates of evaporated, condensed, and dry milk products are prepared in Washington, D.C. The special dairy statistics office has been maintained since 1941 in Chicago, the principal center of dairy manufacturing and trade, primarily to facilitate mailing and mechanical operations in connection with the preparation of weekly estimates of butter and cheese production and receipts and stocks of American cheese.

Weekly estimates of butter and American cheese production

Sample data on weekly production of butter and American cheese are obtained by means of a card questionnaire (Appendix A, exhibit 32) mailed to about 900 butter and cheese factories. A number of these plants produce both butter and American cheese. Two questions are asked about current production in the week ending Thursday night: (1) The number of pounds of butter made and (2) the number of pounds of milk used in making American cheese. Approximately 95 percent of the cards are returned. In a typical week in July 1962, 418 reports of butter were received on time for the preliminary listing, and 154 were received late; 299 cheese reports were on time and 70 were late.

In the original selection of the sample, an attempt was made to obtain a group of plants as representative as possible of the total butter and cheese production of the country. Consolidation of factories in recent years and considerable shifting from one product to another have necessitated larger samples to maintain optimum precision in estimating. The butter sample represents some 75 to 80 percent of the total production of the country but contains only about 57 percent of total number of plants in the United States. The American cheese sample represents about 70 percent of production and contains only 37 percent of the total number of plants. Obviously, there is a preponderance of large plants in both samples which appears desirable since optimum sample distributions would suggest a nearly complete enumeration of large plants. In some of the more important producing States, reporting plants have been stratified into regular and irregular producers.

Returned questionnaires are sorted by States, and reported quantities are tabulated on State listing sheets. In a few of the major producing States, data are listed by crop reporting districts or by combinations of districts. After data are inspected for obvious errors, totals are obtained. Ratios to the previous week's quantities are computed by matching returns with those received from the same firms the previous week. A few adjustments in the currently reported data may be made when an individual plant reports a large change in production from the previous week, and the change appears not to be fully typical

of the probable trend of production in the State. Production is estimated at this time for some plants which have failed to report, ordinarily by projecting their totals for the preceding week in line with the average rate of seasonal change shown by the reporting plants, and these plants are then included in the matched sample.

Estimates of quantitative production for each State are then made by comparing the current week's production with production in the previous base period for identical sample plants. The base period is a weekly average of production in the plant for the latest enumerated calendar year. The weekly average of the total production of the State during the base period is multiplied by this ratio obtained from the identical plants to obtain the estimate of the current week's production. State estimates are added together into regional totals and then into a total for the United States. Percentage change is then computed by comparing this week's production with estimated production of the previous week, with the corresponding week a year ago, and with the 5-year average for the week; only percentage changes are published by regions. Quantitative figures are published for the United States only.

The original weekly estimates are revised before the next week's calculations, on the basis of late reports received. After the monthly estimate based on additional plant reports is prepared, weekly estimates may be adjusted toward the monthly totals if there is much discrepancy between the weekly and monthly totals. The adjustments are applied to the current weekly sample indications until the time of another monthly estimate. Weekly estimates of the previous year are adjusted to the latest comparable monthly total available.

The estimates of weekly production of American cheese are prepared in a similar way, except for some modifications which are necessary because quantity of milk used for cheese is reported rather than quantity of cheese produced. Ratios between the current week and the previous week are made for identical plants from the reported quantities of milk. Comparisons with the base period, however, require conversion of the milk to an equivalent weight of cheese. This is accomplished with the aid of yield factors (cheese per 100 pounds of milk) which are derived from

plant reports on milk received and cheese made. The differences in yield between the various months are divided among the weeks to make a gradual seasonal change in the yield factors of the successive weeks.

Weekly estimates of production of butter for the 7-day period ending each Thursday are released at 9:00 a.m. on the following Tuesday and those for cheese at 9:00 a.m. on Wednesday. Published reports include estimates of national production in quantitative terms and regional figures on percentage change from the preceding week, from the same week in the previous year, and from average production for the week in the preceding 5-year period. Comparison of monthly totals of the weekly estimates with the subsequent complete plant enumerations shows that the national weekly estimates of butter do not differ from the enumeration by more than 3 percent. The usual range of error is less than 2 percent. A wider error, however, occurs at times in the American cheese estimates, because these plants alternate more with other products and because of the difficulty of estimating cheese from the quantity of milk used.

Weekly American cheese warehouse statistics

Information is obtained from all Wisconsin cheese warehouses relating to cheese receipts and stocks, by styles. Receipts of cheese by styles are reported by major assemblers outside Wisconsin. An example of one of the questionnaires used is shown in Appendix A, exhibit 33. For Wisconsin—the largest cheese-producing State in the Nation—the data represent almost a complete enumeration. Outside Wisconsin, the sample accounts for 50 to 60 percent of the total receipts. Estimates are made for delinquent reporters, but only totals for plants normally reporting are released, with no attempt to estimate the national total. Data showing assemblers' receipts give the only information available as to current production of American cheese by styles. The stocks data provide information each week on quantities of American cheese in storage by styles in Wisconsin.

Monthly estimates of manufactured dairy products

Monthly estimates of manufactured products include estimates of production of butter, cheese by types, ice cream, ice milk, sherbet, Mellorine,

water ice, cottage cheese curd, creamed cottage cheese, and several kinds of evaporated, condensed, and dry milk products. Additional related data on cold-storage holdings of dairy products are discussed in chapter 10.

For making monthly estimates of production of butter and cheese, reports from a sample of dairy plants are obtained on the form in Appendix A, exhibit 34. At midyear 1962, about 302 creameries and 115 cheese factories were on the mailing list to receive the monthly inquiry. To enlarge the monthly samples, weekly data converted to monthly totals are incorporated into the summary indications. About 80 percent of the creameries and cheese plants on the mailing list report fairly regularly. Ice cream reports are obtained from plants partly on the monthly questionnaire (Appendix A, exhibit 34) and partly on a special ice cream card questionnaire (Appendix A, exhibit 32). Returns represent from 50 percent to at times over 60 percent of the total production of frozen desserts. A special questionnaire is used to obtain production of cottage cheese curd and creamed cottage cheese (Appendix A, exhibit 32). Reports received represent over 70 percent of the production.

The data for monthly estimates of evaporated, condensed, and dry milk products are gathered by the Washington, D.C., office on the questionnaires in Appendix A, exhibits 35 and 36. These questionnaires are sent to firms rather than individual plants; for evaporated milk one questionnaire may cover as many as 30 plants. Coverage is approximately 98 percent complete for evaporated milk but may run as low as 60 or 70 percent on some of the dry milk items.

Questionnaires include not only production data but also sales, manufacturer's selling prices, prices paid for milk, and inventory of manufacturer's stocks of products. The production data are expanded to the universe in much the same way as the data on other manufactured dairy products. Sales and inventories, however, represent only those firms reporting, but since the sample is quite large, such data give useful indications of changes.

Methods of preparing the monthly estimates differ slightly for the commodity estimated, but, in general, indications of changes are obtained

as follows: (a) By summarizing identical plants reporting in the previous month and in the current month, a ratio is obtained which, when applied to the previous month's estimated total production, gives the indicated production for the current month; (b) by summarizing identical plants reporting both in the current month and in the same month a year earlier, a ratio between the production of the 2 months is obtained and applied to the estimated or enumerated total production in the corresponding month a year earlier to secure an indicated current monthly production; (c) for butter and American cheese, a third indication is obtained from weekly production data, which are available only for these products.

With these indications, the statistician makes his estimates, giving proper consideration to size of the sample and usual reliability of each indication. Charts of the historic relation give a basis for eliminating consistent bias.

Preliminary monthly estimates are released between the 20th and 30th of the month following the month to which they relate, the release date depending on the commodity involved. A month later, when a number of delinquent reports have been received, the estimate may be revised if there are changes in the year-to-year indication shown by all reports, including those not available the previous month. Results of the annual survey of all dairy product manufacturers are released in July of each year following the year being surveyed. Thus, for about the first half of each year, the year-to-year indication has as a base a monthly estimate rather than the enumeration. When enumerated monthly data for the previous year become available, the base used for the monthly estimates in the early part of the current year may be changed. If so, a revised series of estimates, using the latest base data, is prepared and published in the next monthly release. Ordinarily, these revisions are not large.

Chicago area nonfat dry milk prices

A special summary is prepared of monthly averages of prices (f.o.b. factory) received by manufacturers for carload lots of nonfat dry milk solids (for human consumption) sold from factories in Indiana, Illinois, Michigan, Wisconsin, and Minnesota. These average prices are used by

some milk market administrators in formulas for determining the prices to be paid producers for milk. The information is obtained on a special Nonfat Dry Milk Report questionnaire (Appendix A, exhibit 37) which covers sales from the 26th of one month through the 25th of the next. This period is used instead of a calendar month to allow time for preparation of the averages and their release by no later than the fourth of the month following the end of the period. All drying plants in the area are on the mailing list to receive the questionnaire, but only about half respond. Average prices are computed for both spray and roller process products. The data are edited, and all items that obviously represent less than "carlot" sales (about 30,000 pounds) and any prices which appear erroneous are deleted. Sales and prices are listed according to whether the sales were made to (a) Government agencies, (b) wholesalers, (c) direct users, and (d) others. Prices reported by individual factories are weighted by individual sales during the month to give a weighted average price for spray and roller processes separately.

Prices paid by dairy plants for milk of manufacturing grade used for butter, cheese, and condensery products

Average monthly prices paid by dairy manufacturing plants for milk of manufacturing grade used for cheese, for butter and byproducts, and for canned condensed and evaporated milk are obtained from data supplied by cheese factories, creameries, and condenseries. Prices paid for milk, for cheese, and for butter and byproducts are collected on the Monthly Dairy Products Report (Appendix A, exhibit 34) and prices for milk for canning on the form in exhibit 35. Information obtained from dairy plants includes quantity of milk purchased, quantity of fat in the milk, and total dollars paid f.o.b. factory or country receiving station. As the questionnaires are also used to collect data on production of manufactured products, the sample selection follows the pattern outlined previously under production estimates.

Some limitations are imposed on the selection of the sample for obtaining prices received by farmers for milk used for cheese and for butter and byproducts by the fact that State field officers

also send questionnaires to dairy plants for similar information. Duplication between the State list and the Chicago list is avoided so that the burden of reporting by plant operators is held to a minimum. Statisticians in nine State offices cooperate with the Chicago office by sending out questionnaires and estimating monthly production of butter, cheese, frozen desserts, and cottage cheese and prices paid by manufacturing plants for milk used for making butter and cheese. They prepare the estimates and submit recommendations to the Chicago office for their particular States.

The quantity of milk received, total pounds of fat in milk, and total dollars paid for the milk delivered to the plants are listed and summarized by States. In a few instances, estimates are made for missing reports when the State average would be materially influenced by omitting data for a plant that normally reports. State totals are carried to summary sheets, and State averages of prices per 100 pounds of milk, fat test, and prices per pound of fat in milk are computed. State averages so obtained are carefully reviewed in light of various check data such as historic series of milkfat test and wholesale prices of butter and cheese at terminal markets.

National average prices paid for milk used for American cheese are obtained by weighting State averages by current estimates of cheese production. National average prices of milk for miscellaneous types of cheese and for butter and byproducts are computed by weighting State average prices by the approximate quantity of milk used for those products. On milk for canning, State average prices are combined in accordance with the volume of milk reported, since price data are obtained for nearly all the milk purchased by condenseries. Late reports are tabulated, and the data are added to the preliminary totals and averages to give revised averages. These are published in September of the following year. Charts showing historic month-to-month changes in fat tests of milk are used in reviewing the current data and making the estimates.

Prices of milk for cheese (23 States, 5 regions, and the United States for American cheese, United States for 6 other types of cheese) and

milk for butter (16 States, 4 regions, and the United States) are published in Milk Prices Paid at Creameries and Cheese Factories usually released on the last working day of the following month. Prices of milk for canning appear in the

Evaporated, Condensed, and Dry Milk Report issued about the same time. United States prices of milk for the three uses are combined to obtain a national average price of manufacturing grade milk.

CHAPTER 10. COLD STORAGE*

About 50 years ago, when statistical information was lacking regarding the quantity of food holdings and the practices of the refrigerated warehousing industry, it was inferred in some quarters that long-term storage of food was a common practice. Also, it was charged that cold storage warehouses were being used to "corner food supplies," and that this action raised prices to the consumer. Because of these criticisms, the Secretary of Agriculture was asked to investigate these charges to determine whether the criticisms were justified. Accordingly, an inquiry was started in September 1911; as the investigation progressed, it also seemed desirable to ascertain whether long term storage of food influenced prices.

Much information was collected during the period of inquiry. Facts about movement of stocks into and out of storage, as well as prices for such food items as butter, eggs, poultry, beef, mutton, and pork were summarized, and an analysis of the data was published in a Departmental bulletin. The conclusions of the investigators refuted the contention that commodities were held for unduly long periods. Their report pointed out that long-term storage was exceptional rather than the rule. Moreover, it was also shown that the costs for extended storage, when added to the original costs of the products, could exceed the actual market price and preclude a profit to the owner, except during periods of rapidly rising prices.

This investigation of the cold storage industry was a major project of the Department of Agriculture in 1911, and the findings were incorporated into the annual report of the Secretary that year. Even though the investigation showed there was no basis for the criticisms directed against the cold storage industry, the Secretary recommended that the affairs of the storage industry be reported to the public so they would know the quantity of goods in storage and the movements into and out of storage each month. He recom-

mended further that food warehousemen be requested to send monthly reports containing the desired information to Washington, where they could be summarized and the results be released to the public on a previously announced day of the month, as are crop reports.

This recommendation was adopted in 1914, and in that year periodic reports on apple stocks in cold storage were begun. In 1916, the cold storage reports program moved into other commodity areas—creamery butter, shell eggs, American cheese, frozen and cured meats. Since then further enlargements and refinements have been made in the program; today the monthly Cold Storage Report provides information for 83 different stock classifications.

The Cold Storage Report which is released from Washington each month, usually on the 15th, contains national and regional stock data for fruits, vegetables, juices, butter, cheese and other dairy products, eggs, poultry, and meats. In addition, holdings of dairy products, poultry, and eggs are also provided on a State basis. Also, for comparative purposes, national holdings of a year earlier and statistics on average monthly holdings for the date for the previous 5 years are provided.

SCOPE OF COVERAGE

The cold storage program is concerned primarily with food holdings in refrigerated facilities, artificially cooled to temperatures of 50° F. or lower, in which products generally are placed and held for 30 days or more. Excluded are products in refrigerated facilities operated or maintained by wholesalers, jobbers, locker plants, chainstore warehouses, and similar types of businesses that generally hold products less than 30 days. The primary intent of the Department's cold storage reporting program is to measure "reserve" food supplies immediately outside of con-

*By Melvin R. Banks.

sumer pipelines, not the total amount of food held under refrigeration each month. Almost all of the statistical information for this program is gathered by questionnaires mailed from Washington to operators of both public and nonpublic facilities that total approximately 3,200. These warehousemen voluntarily comply with the request for stocks information each month in support of the Department's cold storage reports program so both the food buyer and food seller may be adequately informed about national food holdings in the marketplace. This reporting program was mandatory during World War I and World War II.

For the purpose of analysis, the cold storage warehouse industry is classified as follows:

1. *Public general cold storage*: Any artificially cooled warehouse, the operator of which is engaged in storing food commodities requiring refrigeration for others for pay.

2. *Private general cold storage*: Any artificially cooled warehouse, the operator of which conducts a warehousing business to facilitate his main function as a producer, processor, or distributor but does not store commodities for others for pay.

3. *Semiprivate general cold storage*: Any artificially cooled warehouse, the operator of which uses part of the space for the storage of his own commodities and, in addition, stores in his plant various food commodities for others for pay.

4. *Meatpacking establishment*: Any slaughtering plant engaged in processing dressed animals and animal products and having storage rooms for meat and meat products.

5. *Apple house*: Any warehouse (public, private, or semiprivate) the owner and operator of which is engaged mainly or exclusively in the storage of apples, pears, or both.

METHODOLOGY

In order to provide the accuracy needed for the Cold Storage Report, it is necessary that all new warehousing facilities, whose storage activities fall within the scope of the cold storage report program, be represented in the monthly national summaries. Continual reviews are made of trade papers, journals, and other literature to learn of new plant construction, and further checks are made on the completeness and adequacy of the reporting number through field

travel by statisticians from Washington and State offices.

In the Washington office, a card for every cold storage warehouse that is now or has been in operation at any time since the cold storage reporting program started is maintained in a master file. On each plant card, notations are made regarding the date a letter of inquiry was mailed requesting its participation in the program and the date the plant was added to the reporting list. If the plant is not added to the mailing list because its warehousing activities do not come within the purview of the reporting program, this, too, is noted on the card. Other notations are made on the file card, such as name changes, location identification codes, and related information concerning the activities of the warehouse.

All operators of cold storage warehouses receive a monthly cold storage questionnaire (Appendix A, exhibit 38) on which to list their inventories. This form is due in the Washington office within 6 working days after the close of business on the last day of the month. Each questionnaire is imprinted with the name and mailing address of the plant and with a series of statistical codes assigned to the facility. The codes identify the following in preparing summaries of the data: The type of warehouse (such as public, private, semiprivate); region, State, and city location; numerical identification of the plant; and the county and metropolitan area in which the plant is located. Generally, the assigned codes stay with the plant for as long as it is a place of storage, even though the management of the plant may change. Should the storage go out of business, the plant code number is not reassigned.

Each warehouse operator is provided with an addressed envelope that requires no postage for mailing his stock report to Washington. When the reports are received in the Washington office, they are recorded on "check-in" cards. There is one card for each active plant in the United States. These cards are used to identify plants from which reports have not been received, and for which stocks need to be estimated for the current month's report.

Soon after the reports are checked in they are matched with corresponding questionnaires submitted by warehouse operators the previous

month, and an item-by-item review is made. The purpose of this editing is to eliminate incorrect stock entries, to make sure that the weights are in the prescribed reporting units, and to check whether the change in food levels from one month to the next appears to be reasonable. Any stock entry that appears to be out of line on the basis of historical change is confirmed or corrected by telephone, telegraph, or letter.

Upon completion of the editing, the data on the questionnaires are transferred to data punch cards. Every item has a commodity code, and a card with the commodity code and quantity is punched for each of the 83 food items on the cold storage questionnaire. For those firms that (usually about 10 percent) have not reported by the time the national summary is to be prepared, estimates are made of the stocks in storage at the close of the reporting period.

Estimates of commodity weights on a plant basis are made by one of three methods: (1) by applying seasonal indexes (5-year averages) to the previous month's weight for each commodity; (2) by using the weighted percentage change indicated by matched-identical plants, that is, plants reporting both in the current and previous month; or (3) by using the weighted percentage change indicated by the "ratio-to-base" method.

Whatever factors are selected are programed into an electronic computer to obtain estimates of stocks in nonreporting warehouses. Data cards for estimated firms are merged with the data cards prepared from documents received in Washington, and a national summary by commodities is printed on electronic accounting machine paper tapes. These "print-outs" give State and regional breakdowns when required. Late schedules (those received after the report is released) are substituted for the estimated stocks, and revised commodity totals are reported in the succeeding month's Cold Storage Report.

In addition to commodity reports, public ware-

housemen also furnish the Department data on the occupancy of their cooler rooms (30° to 50° F.) and freezer rooms (0° F. and below). These occupancy reports are processed in the same manner as the commodity report; that is, they are checked in and edited for completeness and accuracy, and, when necessary, estimates are made for missing reports. Machine tabulation provides the necessary summarization of city, State, and regional breakdowns of the data.

REPORTS

Monthly Cold Storage Report.—The summarized preliminary commodity totals for the current month's report are compared with the revised data of the previous month and those of a year earlier and with the 5-year monthly average before all these data are released to the public. The purpose of this review is to make sure that the stock levels for both the revised and current months appear to be reasonable and consistent and free of editing or data-processing errors. On the day of release, usually on the 15th of each month at 2:00 p.m., the national totals are released from Washington through the leased wire network to all market news and area information offices of the Department of Agriculture, and a more comprehensive printed report is distributed by direct mail to all who request copies.

Annual summary.—End-of-month holdings by regions for all commodities for the calendar year are published around April each year, in summary form for ready reference.

Capacity of cold storage warehouses.—The space survey which has been conducted biennially since 1921 shows total refrigerated warehouse capacity in the United States. Data on refrigerated space, classified as to freezer and cooler space, are collected by special questionnaire from all cold storage operators. Capacities by warehouse classification and by city, State, and region are published in detail.

CHAPTER 11. PRICES AND FARM LABOR*

SCOPE

Prices Received, Prices Paid, and Farm Labor

The subject matter encompassed by Prices and Farm Labor statistics consists of four major categories:

- (1) Prices received by farmers for the commodities they sell.
- (2) Prices paid by farmers for the commodities they buy for family living purposes and for farm production, including services, such as telephone service, electricity, taxes on farm real estate, and interest on farm mortgage indebtedness.¹
- (3) Parity prices.
- (4) Farm employment and wages paid to hired farm labor.

Historically, the collection of data on prices received by farmers for commodities and of data on wages paid to hired labor antedate the collection of data on prices paid for commodities. Systematic collection of prices of 10 crops² as of December 1 began in 1866, and collection of January 1 "farm values" of 6 species of livestock³ began in 1867.⁴

*By B. Ralph Stauber, Roger F. Hale, Richard J. Schrimper, Harold C. Phillips, Rex G. Butler, Burton J. Harrington, Rudolph J. Wagner, Paul A. Walsh, and John E. Cochrane.

¹It should be noted that taxes on farm real estate and interest on farm real estate secured by farm mortgage indebtedness are not covered by the data collection operations of the Statistical Reporting Service, but are represented by series compiled in the Economic Research Service.

²Wheat, corn, oats, barley, rye, buckwheat, potatoes, sweetpotatoes, tame hay, and tobacco.

³Horses, mules, milk cows, other cattle, sheep, and hogs.

⁴U.S. BUREAU OF AGRICULTURAL ECONOMICS. PRICES OF FARM PRODUCTS RECEIVED BY PRODUCERS. U.S. Dept. Agr. Statis. Bul. 14, Jan. 1927 (p. 1).

SARLE, CHARLES F. RELIABILITY AND ADEQUACY OF FARM-PRICE DATA. U.S. Dept. Agr. Bul. 1480, March 1927.

In Bulletin 1480, Dr. Sarle states, "Systematic collection of farm prices by the department began in 1867,

Until January 1, 1908, these prices were collected annually, but beginning with that month, prices of several of the more important farm products were collected on a monthly basis. The commodities covered monthly in 1908 were wheat, rye, corn, oats, barley, buckwheat, potatoes, and hay (loose). Chickens, eggs, and butter were added in 1909 to the monthly data collection program, and beef cattle, veal calves, milk cows, milk (wholesale), hogs, sheep, lambs, wool (unwashed), and horses were added in 1910.

Other commodities have been added (and some dropped) from time to time until in recent years the number of commodities for which prices are collected totals about 215 (110 monthly, others monthly in season, and the remainder on an annual or season average basis). The collection program covers commodities accounting for around

when farm prices of crops and farm values of livestock as of January 1 were obtained from correspondents. In 1872 the date for reporting prices of crops was changed to December 1. After the change was made it became customary to consider the crop prices reported as of January 1, 1867-72, as equivalent to the prices prevailing one month earlier (December 1 of the previous calendar year), and for many years past these prices have been published as of December 1, 1866-71, making a full series of December 1 prices for crops. No change has been made in the date for reporting values of livestock. The prices of crops and the values of livestock for the period, 1866-78, as now published have been reduced to a gold basis, using equivalents supplied by the United States Treasury Department."

The January 1 date for the earlier years of this series is confirmed by the record of publication of January 1 prices in the January Monthly Reports of the Department of Agriculture for January 1867, (page 63) and in ensuing reports through January 1, 1870. The Monthly Report for January 1874 (page 11) quotes prices as of December 1 the previous year, i.e. for 1873.

Interestingly enough, the Monthly Report for January 1866 presents a "table showing the average yield per acre and the average prices of the principal crops of the loyal Atlantic States for 1864 and 1865." Data are presented for January 1, 1865, and January 1, 1866. This was evidently the forerunner of the "systematic reports" mentioned by Dr. Sarle as beginning in 1867.

93 percent of the total aggregate value of agricultural commodities, the principal omissions being products of farm forests, and of nurseries and greenhouses. Beginning in 1924, data were collected as of the middle of the month, instead of the first, and at this time the earlier data were converted to a midmonth basis by averaging the prices on the first of 2 consecutive months.⁵

The first inquiry concerning prices paid by farmers was made in May 1911, at which time a price for 1910 and for 1909 were requested for 86 items, some of which were used in production and some of which were for purposes of family living. These inquiries were made on an annual basis for a time, except for bran, cottonseed meal, clover seed, timothy seed, and alfalfa seed, which were monthly. In 1926 all inquiries were transferred to a quarterly basis. Monthly inquiries of feed prices were reinstated in 1935. At the same time a system of monthly inquiries to chainstores was initiated, which continues to the present and is largely the basis for the interquarterly prices paid indexes. The number of commodities has been expanded from time to time, and although the coverage does not approximate 93 percent of the universe as in the case of prices received, the commodity representation is for the most part reasonably adequate, except for medical, dental, and other health expenditures, including hospitalization costs.

The field of services is represented by an annual inquiry on monthly bills paid by farmers for telephone and electric service, together with Economic Research Service surveys covering taxes on farm real estate and interest on farm mortgage indebtedness secured by real estate.

Data on wages paid by farmers for hired labor have been collected since 1866. Until 1909, collection appears to have been at least once in three years. From 1909 to 1923 data were collected annually, and, beginning in 1923, collection has been quarterly. From the beginning, rates per month and per day, each with and without board, have been reported. Refinements in the series, additional breakdowns of the wage rate categories, and questions to collect collateral information, have been introduced from time to time. Data on

farm employment have been collected since 1900, with changes from time to time in the detail and form of reporting.

Indexes

The Index of Prices Received by Farmers and the Index of Prices Paid by Farmers, including Interest, Taxes, and Farm Wage Rates both have a long history which has been detailed elsewhere.^{6 7 8}

The Index of Prices Received by Farmers had its genesis in certain computations of the average prices of 10 crops. These indexes were published in the March 1909 issue of the "Crop Reporter," and in succeeding monthly issues of its successor, the "Monthly Crop Report." The Index has been revised several times—the most recent revisions were as of January 1959. (See footnote 7.)

The first version of the Index of Prices Paid by Farmers was published in 1928.⁹ This index also has been revised several times and updated, the latest revision having been as of January 1, 1959. (See footnote 7.) This revision carried back to September 1952, reweighting the series on the basis of information derived from a nationwide survey of farmers' expenditures during 1955. The Prices Received Index, on the other hand, was weighted by sales data for the period 1953-57, a 5-year period centered upon 1955.

Uses

The data on prices of commodities sold by farmers and the prices of commodities bought by farmers serve a number of uses. The most important of these have to do with the computation of gross and net income, the preparation of the indexes of prices received and prices paid by farmers including interest, taxes, and farm wage rates, the computation of parity prices for farm

⁶ STAUBER, B. R., KOFFSKY, N. M., AND RANDALL, C. K. THE REVISED PRICE INDEXES. *Agr. Econ. Res.*, Vol. II, No. 2. April 1950.

⁷ STAUBER, B. R., HALE, R. F., AND PETERSON, B. S. THE JANUARY 1959 REVISION OF THE PRICE INDEXES. *Agr. Econ. Res.*, Vol. XI, Nos. 2 and 3, April, July 1959.

⁸ U.S. DEPARTMENT OF AGRICULTURE. AGRICULTURAL PRICES AND PARITY. Vol. I of MAJOR STATISTICAL SERIES OF THE U.S. DEPARTMENT OF AGRICULTURE, *Agr. Handbk.* 118, August 1957.

⁹ See page 34 of item cited in footnote 8.

⁵ See pp. 1 and 2 of Statistical Bulletin 14 cited in footnote 4.

products, and the making of economic analyses of factors having a general bearing on the economics of agriculture and the welfare of farmers.

Parity prices, of course, are used in establishing the level of price supports for a number of farm commodities and in administering marketing agreements.

GENERAL PROCEDURES

Sources of Data

For both prices received by farmers and prices paid by farmers the objective is to collect data from sources as close to actual transactions as possible. For prices received by farmers, these sources consist mainly of dealers, commission firms, buyers, and the like who participate in transferring ownership of farm commodities from the farmers to the next stage in the marketing process. It is at the point of ownership transfer that the basic price received by farmers is determined; therefore, this is the stage in the marketing process at which price information is sought.

Accordingly, the preferred type of reporter for prices received is the buyer or dealer in farm products. In some cases reports are obtained from bankers, farmers, or others, who by virtue of their position are likely to be informed concerning the prevailing level of the prices for various farm commodities.

Farmers are good sources of information if they can be reached about the time they sell their product. Thus, for items such as eggs, which are marketed more or less continuously throughout the year, a farmer who specializes in egg production is a first-class reporter. But for products such as wheat that are sold only once or twice a year by a given farmer, reports from him at other times are likely either to reflect his own sale (and thus not to represent prices as of the date of reporting) or lack of firsthand knowledge of the market.

For prices of items bought by farmers the preferred source is the purveyor of the commodity in question. Thus, for prices paid for food, the mailing lists are composed of managers of food stores in rural areas. For prices of clothing, the list is made up of clothing stores. For prices

of feed the lists include feed dealers, and lists for other commodity groups are similarly composed. Here again, farmers who buy feed more or less continuously might be presumed to know current feed prices, but for prices of clothing, autos, tractors, refrigerators, and heavy farm equipment generally, they would normally be well informed only at the time of purchasing such items. Although food is bought frequently, it is doubtful that farmers can recall the price most recently paid for the individual items on the weekend grocery list. Accordingly, dealers generally provide the most promising and best informed source of prices of things bought by farmers.

Most of the information is collected by means of a mailed questionnaire. To some extent this is supplemented by enumerative checks of various types, depending on the commodities in question. Prices of beef cattle have been collected by enumeration of actual sales at commission firms and buyers in a number of States. Prices of automobiles reported by mail are supplemented in a number of States by inquiries to dealers in a sample of towns selected on a stratified random basis. Supplementary inquiries are conducted also in the towns or cities where field offices are located.

It has long been recognized that the mail questionnaire has a number of limitations. Among these, for example, is the fact that it is rarely possible to secure 100-percent response from a randomly drawn sample of respondents, whether dealers, farmers, or others. Usually the response to such an inquiry may be expected to be well under 50 percent. The random character of a sample thus cannot be maintained unless means are available for following up on nonrespondents.

A second closely related problem is the difficulty of maintaining continuity of reporters. The shift of reporting dealers from those who handle one make of farm machinery to those who handle another, for example, introduces wide variability into the reported prices.

A third problem in operating mailing lists is the framing of questions so as to state with sufficient clarity the characteristics of the item which is to be priced without at the same time identifying the item so precisely as to exclude reports from many parts of the country. This difficulty arises through the fact that there is variability

in the types of many goods offered by merchants in different parts of the country. Quite possibly this problem is not as serious as it was at one time, owing to the unifying effect of the growth of chainstores, standard brands, and more universal methods of merchandising and advertising. Nevertheless, some regional variation persists. Despite these limitations, however, the mail survey has been used as the basic method of data collection, owing primarily to the cost factor and available resources.

Field Office and Washington Processing

The program involved in collecting price data as of the 15th of the month (as represented by the 5-business-day period centered on the 15th of the month) and culminating in the publication of a report on or about the 29th (depending on the way the weekends fall) involves an intricate and rigidly scheduled time sequence of operations, both in the field offices and in Washington. The normal sequence of operations begins with the addressing of questionnaires in the field offices and includes in sequence the filling of envelopes and mailing of questionnaires (together with newsletters or other material designed to encourage cooperation on the part of respondents), return of the questionnaires, updating of the files, initial data processing in the field office, transmission to Washington, review in Washington, making a variety of computations, preparing text for the report, preparation of stencils for the report, publication of the report, transmission of data to the field offices, the issuance of a State report, and updating of historical records.

Considerable background or preparatory work, of course, is necessary if the monthly surveys and reports are to progress smoothly. Thus a number of mailing lists must be maintained in the field offices. These lists must be updated and new names continuously added to replace dropouts. Various sources are used to secure as complete coverage as possible. In the area of prices paid, for example, the primary source of information, as already noted, consists of merchants who sell goods to farmers.

In order to secure extensive lists of merchants serving farmers, various means are employed. These include: (1) the collection of classified telephone directories from small towns and the tabu-

lation of merchants by type of business; (2) securing lists, classified by type of business, from State tax authorities, who usually maintain lists of dealers reporting sales taxes; (3) obtaining lists from State agencies administering State unemployment or compensation insurance programs, and (4) compiling from county newspapers serving rural areas names of advertisers, by type of business. In addition, the Washington office has from time to time secured commercial lists of different types of enterprises and supplied these to the State offices for use in maintaining mailing lists. Field offices have circularized farmers to determine where they buy or sell specific groups of items. By these means a fairly comprehensive list of the dealers serving the farm community can be assembled as a source from which to draw new names as the lists of reporters must be expanded.

With the resources available, it has not been practicable to maintain probability samples in view of the numerous subuniverses of buyers and sellers to be sampled and the lack of means by which to follow up on nonresponse. Rather the effort has been to maintain geographical distribution so that prices are reported from all or most of the areas that are important to the agriculture of the State. This preparatory background work, of course, must be done prior to designated field office mailing dates so that as the time for the monthly report approaches the mailing lists are ready to use.

Questionnaires are mailed in time to reach respondents on or about the 15th and are returned to the field offices shortly thereafter. Field offices are instructed not to utilize reports dated before the 5 business days centering on the 15th, thus maintaining the strict midmonth character of the price data.

Upon the return of the questionnaires to the field offices, they are edited, summarized, and the individual commodity totals and averages entered on State and district summary forms. These then are utilized by the Statistician in making his formal recommendation of the State average price. Normally, the Statistician's recommendation will be the average reported, although if there is conclusive evidence that the sample is biased or incomplete the Statistician may need to make allowance in his estimate for this incom-

pleteness or bias. In such cases, the instructions call for an explanation of the reasons for this allowance in the Statistician's comments, which are submitted to Washington, along with the data summary. (See Appendix A, exhibit 39 for a representative State Summary Sheet for prices paid and exhibit 40 for prices received.)

Upon their receipt in Washington the data are transcribed to a national summary for each commodity which provides space for entering the number of reports, the straight and weighted averages, the Statistician's recommendation, and a column for the Board reviewer to enter the official Board estimate. Wherever currently available, additional sources of information are tapped. In such cases the Board reviews the various data and enters on the computation sheet the official Board estimate. If this differs from the Statistician's recommendation, the Board Reviewer prepares a written explanation of the reasons for the difference, which is returned to the State Statistician.

After the adoption of the Board estimates by States for each commodity, regional and U.S. averages are computed. The national averages then are used in the computation of the various indexes and the appropriate State, regional, and national price estimates and indexes are entered on the stencils from which the monthly report is run.

Upon return of the data to the State offices, the States utilize them for computing State indexes and issue such State reports as may be called for by their publication program. Permanent records of reporter response are maintained in the originating office, and of State and national price estimates in both Washington and the respective field offices.

The procedures as described above are almost entirely manual. However, considerable exploration and experimentation has been underway in the use of automated data processing procedures, and some of the latter are being used on a limited basis. Such procedures, when perfected and finally adopted, contemplate making more detailed comparisons than are feasible at present, such as weighting of reports by type of dealer, making current to historical comparisons by individual dealers or by groups of dealers, and computing standard errors of the current informa-

tion, either routinely or from time to time. They contemplate also modernized methods of maintaining mailing lists and the likelihood of selecting probability samples by automated procedures. These in turn will require intensive followup of nonresponse, with higher costs, in order to maintain the integrity of a probability sample.

Price Research Project

In an attempt to find means to remedy some of the weaknesses of the mail questionnaire system outlined above, a price research project was initiated in Ohio in 1958 and shifted to Colorado in 1963. This project involves collection of prices by enumeration in a sample of stores selected on a stratified random basis. The design of the sample drew on information concerning farmers' buying and selling habits derived from a marketing channel survey made as an initial step in the research project.

Although most commodities showed some differences between the prices reported on the mail survey and the prices reported on the enumeration, many of the differences cannot be regarded as statistically significant, nor can the mail returns be classified as being specifically biased either upwards or downwards. For a relatively small proportion of commodities significant differences were indicated. The mail survey may be regarded as doing a reasonably good job in reporting the prices received and paid by farmers. However, a considerably better job could be done by using enumeration, together with a sample designed by probability methods.

Publication Program

The principal vehicle for publishing prices received and prices paid by farmers is the monthly publication *Agricultural Prices*, issued on or about the 29th of each month by the Statistical Reporting Service. This publication reports State, regional, and national averages of prices received and paid as of about the middle of the same month. The current publication covers major items. Many items, particularly in the field of prices paid, are available only on a national basis at quarterly intervals, and some commodities sold by farmers are priced only semiannually or annually.

Additional prices received information is published in Crop Values, issued annually in December.

In Statistical Bulletin No. 319, "Prices Paid by Farmers for Commodities and Services, United States, 1910-1960," the Statistical Reporting Service brought together for the first time under one cover the complete series of U. S. average prices paid by farmers for commodities as used in the construction of the Parity Index from 1910 through 1960.

An annual summary of agricultural prices (1959 through 1963 have been issued to date) brings up to date by months, by States, regions, and for the United States the more important price series, both in prices received and prices paid. This summary updates generally the several series published earlier in "Crops and Markets" annually until 1958, and in "Prices Received by Farmers, United States, 1908-55" (USDA Statis. Bul. No. 180). Various supplements to Agricultural Prices are issued from time to time, bringing to date or revising prices for certain commodities or groups of commodities.

Revisions

For many commodities the amount of information available at the time of publishing the current price report is limited. In some such cases more complete information is available at a later date. The sources and timing of such later information are varied, depending on the commodity. In some cases more complete data are available within a month or two; for many commodities, including the meat animals, milk, and a number of fruits, the data are available from 12 to 18 months later; for a few items, handled largely by cooperatives under pooling arrangements, final data are sometimes not available until two, three, or more years later.

It is the policy to issue revisions in prices as soon as practicable after reasonably complete information is received. For prices paid, these revisions are published generally one year after the date to which the specific estimate applies. It is the policy also to make revisions in both the Index of Prices Received by Farmers and in the Parity Index on the basis of the revised data.

Major revisions in the prices received and prices paid indexes generally are associated with the

availability of rather comprehensive information concerning the buying pattern of farmers. Such was provided, for example, by the 1955 Expenditure Survey for the revisions made in January 1959. The source of weight data for the 1950 revision was a survey year near the beginning of the 1937-41 period and one year near the end. The policy has been adopted to recommend a revision in the indexes and the making of the necessary surveys at intervals of approximately 10 years. The necessary surveys, however, are rather expensive and must await the availability of special appropriations.

PRICES RECEIVED BY FARMERS

Nature of Price Estimates

Series of "prices received by farmers," as published by the Department of Agriculture, relate generally to average prices farmers receive for their products sold at local markets, or at the point to which farmers deliver their products in their own conveyances, or in local conveyances which they hire for the purpose. Prices received by farmers are estimated to reflect sales of all classes and grades of the commodity being sold. They reflect discounts for poor quality and include quality, quantity, or any other premiums. The average-price concept is that of a price which, if multiplied by the total quantity of the commodity sold, would give the total amount received by all farmers for that commodity.

The primary reason for this definition of price is that one of the chief uses of the price data is to evaluate marketings of commodities, and thus to develop estimates of income to agriculture, which, of course, is a part of the National Income Account. Estimates of production of agricultural commodities relate to the commodity defined (wheat, oats, barley, hogs, beef cattle, etc.) not differentiated by market grades and classes, as it has never been feasible to make estimates of production or sales on such a refined basis. If the result of multiplying quantity sold by price is to be meaningful in terms of receipts from sale of the commodity, the commodity price by which quantity sold is multiplied must be of the same dimensions as the commodity quantity. Since the quantity sold includes varying grades of the commodity, some of which bring a relatively high price and some a relatively low price, the price

used should represent the average for all grades sold. This then becomes, by definition, the "price received by farmers."

Although price estimates for most commodities are defined as relating to the 15th of the month, a more descriptive term would be "midmonth prices," since reports for the 13th-17th of each month are used as the basis for most of the estimates. In computing income and receipts from marketings, these midmonth prices are used to represent the average price received for the commodity during the month.

For the following commodities the estimate is defined as the monthly average: Apples, peaches, pears, citrus, potatoes, tobacco, wholesale milk, broilers, and wool. For meat animals, milkfat in cream, and seeds, prices are estimated on a mid-month basis. However, when check data subsequently become available, midmonth prices for these commodities are reviewed shortly after the end of the year and revised where necessary to reflect monthly averages or to weight out to the season average indicated by check data. For commercial vegetables for fresh use, prices are estimated for the first half of the month. Marketing data subsequently available for the last half of the month are combined with similar data for the first half and used as the basis for monthly average prices.

Midmonth or monthly average prices are estimated each month for about 95 of the more important crop and livestock items, and for 17 seasonal items in season. Prices of about 100 additional items are estimated on an annual or season-average basis only.¹⁰ These crops have either relatively short marketing seasons—cherries, for example—or they are of relatively minor importance, and season average prices for them are considered adequate. Prices for a few of the minor commodities are collected each December 1. If all of the crop has been sold they are reported as season-average prices. If not, they are reported as the average price to December 1. The December 1 series of prices was begun in 1866.

¹⁰ For counting purposes, an "item" is defined as an agricultural commodity for which prices received by farmers are estimated. Thus, beef cattle, steers and heifers, and cows are considered three separate items, even though the estimated price of beef cattle is a combination of prices for cows, and steers and heifers.

Inventory values per head of livestock on farms on January 1 of each year are estimated by age and sex classifications for each species. They are based on farmers' estimates of the average value of various age and sex classes of livestock, as indicated by current and past replacement costs of similar animals. About 30,000 farmers submit such data on the January Farm Report, and the series for each species goes back to 1867. These data are used to value livestock on farms on the first of each year and in the preparation of the annual Balance Sheet for Agriculture.

In States in which fruits are of major importance, prices are obtained for fruit sold both for fresh consumption and for processing. Average prices of deciduous fruits sold for processing usually apply to bulk fruit at the door of the processing plant, as almost all deciduous fruit sold directly by the grower for processing changes ownership at this point. Prices are obtained by various processing categories (such as canning, drying, freezing, crushing), the choice of categories depending on their importance.

Prices reported as "average" prices often do not reflect the actual proportion of sales by the various utilization and method-of-sale categories. For this reason, when data relating to utilization and price are available, average prices for all methods of sale are derived by weighting the average price for each method of sale or utilization by the estimated amount sold each way.

In addition to the average prices already described, another general type of related estimate has been developed to meet specific needs. When adjustments are made in actual prices to shift to some point of sale other than that at which the sale was made (for example "f.o.b. shipping point" to "packinghouse door"), the results are called "equivalent per unit returns" to growers.

Equivalent per unit returns are usually calculated for two points of sale: (1) Equivalent "packinghouse door" returns refer to all fruit, regardless of method of sale, converted to a price it would have brought if the entire crop, or the segment thereof being priced, had been sold at the packinghouse door. (2) Equivalent "on-tree" returns refer to all fruit, similarly converted to the price it would have brought had the entire crop been sold on the tree.

In arriving at equivalent per unit returns, costs are added to or subtracted from prices of fruit as actually sold. For example, in order to obtain the equivalent packinghouse door returns for Florida oranges, the procedure is as follows: (1) The average price for fruit actually sold f.o.b. packed is reduced by the charge for grading, packing, container, and loading. (2) The average price for fruit actually sold on tree is increased by the cost of picking and hauling to the door of the packinghouse. (3) Season average returns so derived are then combined with the reported price for the portion actually sold in bulk at the door of the packinghouse, by weighting the equivalent price for each method of sale by the estimated volume sold each way.

Data Sources and Procedures

Prices received by farmers for products they sell are collected from various sources, but mostly from voluntary reporters. In general, price reporters may be classified in the following broad groups: (1) country merchants; (2) farm-produce dealers at local shipping points; (3) country mill and elevator operators; (4) Federal Milk Market Administrators; (5) State milk control agencies; (6) managers of milk distributing or manufacturing plants; (7) cooperative marketing organizations; (8) country bankers; and (9) well-informed farmers. The number of price reporters varies greatly between States and between commodity groups. An average of about 10,000 reporters supply information used in the preparation of midmonth or monthly price estimates. Many more supply information later for use in the preparation of revised estimates.

Local market price data have been collected mainly by means of mail questionnaires. These questionnaires are probably the least expensive means of obtaining mass data, although data so collected are subject to certain limitations. Application of enumerative and probability sampling methods to price data for farm commodities has been limited by cost considerations. The weighted stratified sample collected by mail has been considered the most practicable way to obtain local market farm price data within the available budget.

The effectiveness and adequacy of the mail survey depends to a large extent upon obtaining

reports from knowledgeable persons—individuals who buy and sell farm products, or who have frequent and direct contact with those who do buy and sell farm products. The reporting list includes some farmers, although the number of farmer-reporters is relatively small. Since a farmer is less likely to follow the market as carefully after he sells his crop as before, reports from farmers may not be as current as those from dealers.

Types of price questionnaires have varied from time to time according to needs. Forms in Appendix A, exhibits 41 and 42 are examples of the general inquiry currently used in several of the North Central States for collection of monthly price information.

Prices of many farm products have a definite pattern of seasonal fluctuation. For this reason, and also because of memory bias on the part of reporters, it is necessary, for most commodities, to collect reports on prices regularly over the year, or throughout the marketing season. Questionnaires are also regionalized, since the type of agricultural production varies greatly by regions, and the response rate in a particular region tends to decline if questionnaires include commodities not grown in that region. For the monthly price inquiries, 19 different regional questionnaires are used throughout the United States.

Individual reporters usually have direct knowledge of prices for only a few commodities, but tend to report prices of items for which they have only limited information if these items are included on the questionnaire, thereby introducing inaccuracies in the reported data. In order to minimize biases of this nature, separate questionnaires are used to collect prices for crop and for livestock items in some States.

Special inquiries are made for some short-season and specialty crops grown in localized areas. These special inquiries generally ask for prices received by different methods of sale, as well as the volume bought or sold each way. Special inquiries are used mainly for vegetables, fruits, nut crops, some minor field crops, and field seeds.

With some commodities, use of records of cooperatives, auction sales, or of Federal milk market administrators has provided virtually complete price and quantity information concerning

a segment of the market. Whenever available, such data are used to supplement information collected by mail.

Probability sampling methods, together with enumeration of prices received by farmers, are being used to the extent that funds are available.

Enumeration of probability samples has greatly improved the accuracy of beef cattle price estimates in 11 selected States. In these States enumerators transcribe records of sales by farmers through commission firms, auction rings, packing plants, and other cattle marketing agencies. Within States, the markets and firms enumerated were selected by probability sampling techniques. Enumerative survey methods are also used for pricing certain short-season crops grown within concentrated areas, and for some other commodities for which relatively few firms, cooperatives, or individuals handle the bulk of the output.

Other information utilized in estimating average prices includes data collected by other Government agencies, by industries and associations, or at central markets. These data vary in usefulness depending on their character and completeness. Thus, the average value of daily sales of tobacco on auction markets provides a highly useful guide for appraising the price received by farmers for that crop. For some types of tobacco, after resales by speculators are removed, warehouse auction sales give practically a complete census of all sales by farmers. For grain and livestock, reports from central markets give price changes within specified quality gradations. They do not, however, account for shifts in quantities of different grades marketed.

Pricing of milk sold wholesale to plants and dealers is another example of a commodity for which special procedures are required. Wholesale milk prices are for all milk sold during the month. Currently, milk price data, consisting of pounds of milk purchased, pounds of milkfat in such milk, and total dollars paid, are obtained for the previous month from enough reporters to represent the bulk of the milk sales in each State. These data are broken down into (1) milk eligible for fluid market, including surplus grade A milk diverted to manufacture, and (2) milk of manufacturing grade. Also, information regarding changes in class prices for fluid market milk from the previous month to the current month is ob-

tained, along with probable changes in proportions of Class I and other fluid market milk, probable changes in prices for manufacturing grade milk, and seasonal changes in fat test for both grades of milk. Since milk price data for the current month are incomplete when the report is published, preliminary estimates of price and fat test are published for all wholesale milk by States and for the United States for the current month and are revised a month later, broken down for the two grades of milk, on the basis of more complete information. Subsequently, complete milk price and fat test data are obtained for practically all fluid market milk distributors and milk manufacturing plants, and, after the end of the calendar year, monthly prices and fat tests are again revised if necessary on the basis of these more complete data.

To fill the need of the Agricultural Stabilization and Conservation Service for a two-State (Minnesota-Wisconsin) average price and fat test for manufacturing grade milk by the 5th of the following month for use in establishing prices for specified classes of milk in selected Federal order markets, an accelerated program of price collection is in operation. These estimates are based on data obtained from special questionnaires received from random samples of cheese factories, creameries, and condenseries in the two States, supplemented by additional data received by telephone from previously established contacts and any other pertinent information.

Prices Received Indexes

The Index of Prices Received by Farmers, which is published each month, provides a composite measure of the average change in prices of agricultural products from month to month and from year to year at the point of sale by the farmer. Index numbers are also computed for two main groups: (1) crops, and (2) livestock and livestock products. The all-crops index is calculated by combining the following eight subgroup indexes: Food grains; feed grains and hay; cotton; tobacco; oil-bearing crops; fruit; commercial vegetables; and potatoes, sweetpotatoes, and dry edible beans. The livestock-and-products index is calculated by combining the following four subgroup indexes: Meat animals; dairy products; poultry and eggs; and wool. The

Index of Prices Received by Farmers—that is, the all-farm-products index—is computed by combining the group indexes for all crops and livestock and products.

The indexes for the years for which 1953–57 is the weight base period (September 1952 to date) are compiled from prices of 55 commodities which represent about 93 percent of the total value of agricultural marketings during 1953–57. Of the 7 percent of total value of marketings not represented by the 55 commodities in the indexes, nearly 3 percent was accounted for by forest, nursery, and greenhouse products, about 1.5 percent by fruit and nut crops, about one-half of 1 percent by sugar beets, and the remainder by other crops. The value of these commodities is represented in the index by imputing it to subgroups and groups whose price movements are presumed to be reasonably similar.

These indexes are basically of the Laspeyres aggregative type, modified, however, from the traditional formula to: (1) permit reflecting changes over time in the relative importance of commodities by chaining together several “links,” each link consisting of an index computed using as a base period the period from which the weights were derived; (2) introduce (or drop) commodities for which satisfactory data were not available over the entire period covered by the index, or the relative importance of which was too small to include in the entire period; and (3) assign to appropriate commodity groups and subgroups the weights for commodities not specifically included in the index.

In calculating the monthly indexes currently, the average quantity marketed for each commodity for the 1953–57 weight base period is multiplied by the current price received by farmers to obtain a value for the commodity. Values for commodities making up a subgroup index are summed to a subgroup “aggregate.” The subgroup aggregate is divided by its 5-year average aggregate for 1953–57 (the base aggregate) to obtain the subgroup index for the month on a 1953–57=100 basis. The subgroup indexes so computed are combined into the group index for all crops and the group index for livestock and products, using percentage weights derived from the average value of marketings during the period 1953–57 for each subgroup. A similar pro-

cedure is used to combine the all-crops index and the livestock-and-products index into the all-farm-products index.

After the subgroup, group, and all-farm-products indexes for the current month are computed on the basis of 1953–57=100, they are converted and published on a January 1910–December 1914=100 basis and a 1957–59=100 basis. The January 1910–December 1914 period has been specified by law as the base period for computing parity prices of many commodities, whereas the 1957–59 period corresponds to the base period used currently for most Government indexes. The indexes on the 1910–14=100 basis are constructed using 1924–29 average marketing weights for the months January 1910 through January 1935, 1937–41 weights from January 1935 through September 1952, and 1953–57 weights from September 1952 to the present. The indexes on a 1957–59=100 basis are constructed using average marketing weights for 1953–57.

General revisions in the indexes are made from time to time (the precise timing based on administrative determination and other factors) to update weights or to revise earlier weights if necessary and to add or drop commodities from the index where sufficient changes in relative importance occur. In May of each year revisions are made in the monthly indexes for the current year to date and for the 3 preceding calendar years to reflect revisions in the component price series. Additional price information becomes available for about four-fifths of the 55 commodities in the index subsequent to first publication of an estimate; for about one-tenth of the commodities, mainly fruits, vegetables, and milk, final information is not available until about 2 years after the first monthly estimate. About two-thirds of the total number of revisions each year are of fruit and vegetable prices.

Sampling Problems

As has been indicated earlier, monthly estimates of prices received by farmers are based largely on data obtained by mail surveys from voluntary reporters. This is not universally the case, however. Probably the outstanding exceptions relate to wool, wholesale milk, some types of tobacco, and end-of-year data for some of the fruits and nuts. In these cases, particularly at year-end or

shortly after, reports are available that cover virtually all or at least a very large proportion of the commodity sold.

For wool, such extensive coverage of sales stems from the virtually complete records of individual sales required as part of the incentive payment program conducted under the National Wool Act of 1954, as amended. For milk, sales data derive from the records required to be filed with State supervisory agencies by milk handlers and processors, under State legislation. For tobacco, they derive from extensive tobacco auction data available, and for some fruits, from their highly concentrated marketing by large cooperatives, which handle all or virtually all of certain of the commodities. Year-end revisions in the current monthly estimates for these commodities have for the most part been relatively small in magnitude. For some other commodities less complete supplementary data are available, as for example beef cattle, for which special enumerations of marketing data in a limited number of States have been developed.

Under the mail questionnaire approach, mailing lists are established, securing as balanced a geographical coverage as practicable. Questionnaires are frequently accompanied by reports, explanations of the need for the questionnaires, or requests for cooperation, since replies are usually voluntary. In the heavily populated agricultural sections, sizable lists of active reporters can be maintained. For important commodities, upwards of 200 reports in major States are not uncommon. In sparsely populated areas, however, the number of dealers is often very limited, and it is difficult, and sometimes seems impossible, to maintain an adequate number of reports. For highly specialized or minor commodities, or even for important commodities in seasons of light marketings, maintaining an adequate number of reports is frequently very troublesome.

Questionnaires are mailed to these lists, and the replies provide the basic data. Returns from a well-maintained list of price reporters on which habitual nonrespondents are systematically dropped, vary from less than 25 percent to nearly 60 percent, although they are sometimes higher.

The mail questionnaire technique and related procedures have worked reasonably well on the whole and have provided reasonably accurate

price estimates for most commodities in terms of such overall tests as have been available. Although there are several inherent weaknesses in such procedures, they have been continued largely because of resource limitations.

One basic weakness of mail questionnaires is that they do not provide the basis for a determination of the precision of the estimates, and depend for their validity on the knowledge of the subject matter by the statistician rather than upon the unalloyed operation of a scientific procedure of estimating from a scientific sample design.

Another problem associated with mail survey methods is the bias that may be introduced by nonresponse. Inasmuch as the estimates obtained from mail surveys are biased to the extent that response to questionnaires is selective, the replies may not represent the universe of inquiry. A constant effort is made by Statistical Reporting Service statisticians to improve the response to mailed surveys, to maintain geographical distribution of respondents, and thus to promote representativeness. Also, State samples have been stratified by price reporting districts, designed to combine counties which are roughly homogeneous in their production and marketing patterns. State averages are computed—both simple and weighted. The weighted averages for price reporting districts are computed through use of production or marketing weights. This stratification serves to improve the accuracy of estimates if a moderate number of reports is available for each stratum, but otherwise may exaggerate sampling fluctuations.

Response errors are also a problem. Reporters may misinterpret the question or may report a price when they do not have actual knowledge of the price information requested. Thus a reporter may report in terms of a bushel when the question is in terms of hundredweight. Again, a reporter may report the price for a particular grade, for example No. 2 yellow corn, when the average price, covering all grades and qualities being sold, is requested. These are examples of nonsampling errors involved in mailed surveys. Their effect is difficult to measure, but judicious editing procedures can often avoid serious damage from them. Market reports provide useful

guides in editing, as a result of which gross misinterpretations can usually be eliminated.

One means of minimizing response errors has been increasingly to use specialized mailing lists in preference to general, or all-purpose, lists. This process has limits, however, since in its ultimate form it would mean a separate list for nearly every commodity—which would run expense to unbearable levels. Consequently, the practical solution represents a workable compromise between the extremes. Special questionnaires are used for a number of commodities to reach handlers specializing in them. Separation of the crop price questionnaire from the livestock and livestock product questionnaire has also proved advantageous.

A closely related procedure lies in stratifying questions—thus, instead of asking for the average price of beef cattle, questionnaires ask for the price of cows, and of steers and heifers—the two major component groups comprising all beef cattle. Variability within each group is generally less than the difference between them. Weights derived from available records of historical marketings, together with analysis of the inventory balance sheet, are used for combining the price of cows and the price of steers and heifers into an average price for all beef cattle.

To the extent that satisfactory weights can be derived, this process generally results in improvement in the overall average price over that from an undifferentiated question. Prior to introducing this breakout, respondents normally tended to overrepresent steers and heifers in their reported prices, forgetting that cows comprise a sizable proportion of the cattle sold for slaughter.

The totality of sales of a particular farm product is an aggregate of many individual transactions—some involving large quantities, and many sales involving small quantities. These transactions are widely distributed geographically, chronologically, and by type of marketing channel, the pattern differing widely from product to product. For example, most sales of wheat by farmers are made to operators of grain elevators at local points throughout the commercial production areas, but some large growers may undertake to sell in central markets through a broker, or directly. Beef cattle are sold by farmers directly to other farmers, in auction sales in

the county seats, to buyers in local markets, to buyers in central markets, or through cooperative marketing organizations.

Many product buyers are highly specialized and handle only one commodity. Others, such as grain buyers, may handle several grains and may, in addition, sell feed to farmers. The marketing patterns for other commodities display equally great variation. No single type of buyer handles all of the 180 or so farm products, and methods of sale for the same commodity often vary from State to State or from area to area. Thus the sale of citrus fruit is dominated by cooperatives in California; in Florida, sales are made mostly to a number of independent buyers and processors, some of which own and operate large orchards in addition.

As already noted, there are a few commodities for which information approximating the totality of transactions is available at the end of the year, but only for a few types of tobacco grown in limited areas and sold in a few auctions is anything even approximating such a totality available in two weeks after the pricing date. Obviously, then, some type of sampling operation offers the only practicable means of getting acceptable estimates.

Obviously, also, since prices are made in sales, the ideal evidence for determining price is the sales document which identifies the commodity, giving quantity sold, price per unit, and total sum of money to the farmer. Ideally, then, the sample design should be such as to give to each bushel or hundredweight of a commodity an equal (or assignable) probability of being included in the sample. Inasmuch as the pattern of sales for a given commodity is different from that for every other commodity, and, moreover, is different each month for a given commodity, an ideal model would necessarily contemplate a different sample design for each month for each commodity.

Conceptually, then, the problem is simple: (a) Design a sampling plan which will give to every unit of a commodity sold by farmers in the United States during the 5-day period at mid-month an assignable probability of being included in the sample, (b) tabulate the prices and quantities sold from the sales slips covering the selected sales, (c) summarize the data, using

suitable expansion and weighting factors, and (d) complete the operation by publishing such prices by States, regions, and for the United States on the 29th of the same month.

In practice, a number of compromises with the ideal mathematical model are necessary, partly because of the physical impossibility of changing a sampling design month by month in the time limits imposed by the work schedule, partly because designing a separate sample for each and every commodity would run costs to astronomical levels, and partly because absolutely comprehensive lists of buyers of all farm commodities are difficult if not impossible to establish, particularly since not all of those active in the market one month are active in all months.

It becomes necessary then, as a practical matter, to design a sample in terms of groups of generally like items, with probabilities of selection representing their sum total of business over a year and for several commodities rather than for each commodity separately. Owing to the competitive aspects of the price-making process in the economy, it is likely that these compromises lose relatively little in accuracy of reporting.

Other compromises are necessary for the reason that many businessmen are hesitant or unwilling to disclose intimate details of their business to outsiders, or to the Government except as required by law. Some decline to permit inspection of sales documents; others decline to give price information; others decline to give information on quantities sold. In such cases, either an alternate selection of a respondent must be made, or perhaps an "estimate" accepted in lieu of document examination. On the other hand, many businessmen cooperate very fully in such programs.

As in sampling any complex population, it is necessary in sampling for price collection to consider whether an unrestricted random sample would provide the most efficient design. Considering the geographical distribution of agriculture and the marketing structure within any general area, there is considerable basis in fact for the belief that a stratified probability sample, a cluster sample, or some combination would be more efficient.

In view of the importance of the State as a unit of government, both in terms of the economic importance of State statistics and of the adminis-

tration of a Departmental program such as price support and marketing agreements, it seems reasonable to consider the State as one useful basis of stratification. Within States, types of farming may provide a guide to stratification. Almost certainly, the various elements in the marketing structure should be reflected in the strata.

In any case, the design should be based on as much pertinent information as it is practicable to assemble. It would be a rare circumstance in which existing secondary sources would provide sufficiently specific or recent information for the most efficient design. For this reason, necessary preliminaries to designing a sample are first, assembly of as much pertinent information as can be found, and second, a survey of farmers to ascertain the channels through which they sell their products and acquire their supplies. From an analysis of a well-designed and sufficiently extensive survey of this type much of the required information can be assembled. Perhaps equally important is updating this information at relatively frequent intervals.

PRICES PAID BY FARMERS

Data Sources and Procedures—by Commodity Groups

The estimates of prices paid by farmers for commodities and services, prepared by the Statistical Reporting Service, are estimates of average prices paid at independent and chainstores where farmers buy. They are based primarily on replies to questionnaires mailed to voluntary respondents. These respondents are asked to "report the price for the kind or quality most commonly sold to farmers" for a specified list of items selected to represent most of the various groups of items bought by farmers for use in living and production.

Prices paid by farmers were collected for more than 650 items in 1962. To the fullest extent possible, the commodity price data are obtained from merchants in farm trading areas. Questionnaires on prices of food, tobacco products, and items used in household operation, such as soaps and cleaning materials, are sent by mail to grocery stores; those on prices of wearing apparel and household textiles are mailed to clothing and department stores; those on prices of household furnishings to furniture and appliance stores;

those for prices of building material and solid fuels to lumber yards and fuel dealers; those for prices of new and used cars to automobile dealers; and those for prices of petroleum products, tires, and other auto supplies to garages, filling stations, and auto supply stores.

For items bought for use in farm production, feed stores report by mail the price of feed; terminal markets furnish quotations on feeder livestock; farm machinery dealers provide information on prices of farm implements and tractors; hardware stores report prices of small tools and miscellaneous farm supplies; fertilizer dealers report prices of fertilizer and lime; and seed dealers report the prices paid by farmers for grain, grass, legume, and other field seeds.

Farmers report quarterly the basic data used on farm wage rates and annually the rates paid for telephone and electric service. Rates paid for daily and weekly newspaper subscriptions are compiled from trade sources, and subscription rates for a sample of magazines are compiled from their published rates.

Information on tuition fees at State colleges and universities is compiled from catalogues from a sample of such institutions. Rates for first-class letter mail and parcel post packages are taken from information supplied by the Post Office Department.

The Economic Research Service provides annual data on taxes per acre. These data are based on information furnished by town officials in New England, township officials in Pennsylvania, and county tax officials in other States. Each such official is asked to make a judgment selection of 12 farms (5 in each New England State and in Pennsylvania) located in his taxing jurisdiction, such farms to be distributed geographically throughout the taxing area and to represent various sizes of farms. For each farm the official is asked to report the acreage and total amount of real estate taxes levied for both the current and the preceding year. From these data, State, regional, and national averages of farm real estate tax per acre are computed.

These several groups of inquiries cover most of the areas of expenditure by farmers. Yet there are some serious gaps, particularly in the service segment of the farm purchase pattern. Available resources do not yet permit collection of data

on doctors' fees, charges for hospital service, dentists' fees, or rates for custom farm work in many areas. No adequate national coverage of establishments serving farm people in these areas is available.

In 1955, the only time comprehensive information on the towns where farmers trade was collected objectively, two-thirds or more of the total farm purchases of feed, cleaning materials, tobacco, beverages, seed, feed, fertilizer, farm machinery, fencing materials, equipment, supplies, petroleum products, and haircuts were made in towns with less than 5,000 population. Farmer purchases of clothing, furniture, and larger consumer durable items were often made in larger towns—often but not always the county seats—but, as in the case of groceries, most of the production goods were bought in the smaller towns closer to home. (See table 7.)

Except for the larger cities, price information is collected from merchants throughout the entire town-size spectrum, although more than three-fourths of them are located in towns under 10,000 population. The price quotations reported by these cooperating respondents are mostly cash quotations. Except for the limited use of enumerative procedures, there is usually no information available on the extent to which volume discounts, delivery charges, and other special terms of sale are reflected in these quotations.

Only for prices paid by farmers for electricity has it been possible to determine the effect on per unit outlay of quantity purchased. Herein, the average cost per kilowatt hour is derived by dividing the monthly bills by the total number of kilowatts used. This procedure supplies for reporting farms a weighted average of the different rates paid in the applicable blocks of the rate schedule. The reporting of rates paid for local telephone service includes information on the type of service used and the number of parties on the line. The collection of data on utility rates is in contrast to collection of commodity price information in that price information on utility rates is reported by farmers.

Many of the conditions that produce regional or seasonal variations in the kind or quality of products offered for sale to farmers on their local markets also are reflected in the prices reported by merchants. Wearing apparel sold in clothing

TABLE 7.—FARM PURCHASE PATTERNS: *Distribution of purchases, by size of town, United States, 1955*

Item	Purchases made in towns of specified population							All purchases
	Under 1,000	1,000-2,499	2,500-4,999	5,000-9,999	10,000-29,999	30,000-239,999	240,000 and over ¹	
Family living:	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
Food.....	40	18	14	14	9	5	-----	100
Clothing:								
Women and girls.....	9	16	16	19	19	14	7	100
Men and boys.....	12	17	16	19	18	12	6	100
Infant.....	10	16	21	19	19	10	5	100
Materials.....	15	17	18	18	16	10	6	100
Household textiles.....	11	15	15	17	18	13	11	100
Furniture.....	15	17	15	16	19	12	6	100
Rugs.....	15	19	16	18	15	11	6	100
Glassware.....	15	19	16	17	17	10	6	100
Other housefurnishings.....	28	18	15	15	13	8	3	100
Kitchen equipment:								
Refrigerators.....	23	24	13	15	16	8	1	100
Home freezers.....	19	17	20	16	18	8	2	100
Stoves.....	26	15	11	21	12	9	6	100
Other equipment.....	28	19	15	15	13	7	3	100
Cleaning equipment:								
Washing machines.....	19	23	15	18	12	9	4	100
Vacuum cleaners, etc.....	32	18	15	15	12	6	2	100
Cleaning materials.....	33	20	14	15	12	5	1	100
Television sets.....	27	17	13	13	17	10	3	100
Personal care:								
Services.....	34	22	14	13	12	4	1	100
Materials.....	26	21	16	16	13	7	1	100
Tobacco and alcoholic beverages.....	44	17	12	12	9	5	1	100
Production:								
Feed.....	45	19	13	11	9	3	-----	100
Seed.....	40	19	14	13	10	3	1	100
Fertilizer.....	41	20	14	11	9	4	1	100
Farm supplies.....	37	21	13	14	10	4	1	100
Fencing materials.....	43	19	14	10	9	4	1	100
Livestock equipment.....	36	21	15	12	10	4	2	100
Farm machinery.....	33	21	16	12	10	7	1	100
Trucks.....	22	21	17	18	10	9	3	100
Tractors.....	34	18	14	14	12	7	1	100
Living and production:								
Automobiles.....	20	18	15	18	15	10	4	100
Petroleum products.....	40	19	13	13	10	4	1	100
Other motor supplies.....	35	20	14	14	11	5	1	100
Building materials.....	33	19	14	15	12	6	1	100

¹ Including mail-order and out-of-State purchases.

stores in northern States is heavier than that sold in the South, especially in winter. Department stores not infrequently stock their shelves with special purchases for their semiannual white sales. Fresh fruit and vegetables come from one part of the country in the winter season and often

originate in other parts or locally in the summer and fall. The varieties, and frequently the type of pack, vary with the source of supply. These are only a few examples of the constantly changing product descriptions over both space and time in virtually every category of living and produc-

tion items offered for sale in farm trading areas.

Thirteen different series of questionnaires were used to obtain prices from independent and chain stores. (See table 8.) To meet the requirement of regional and seasonal variation in purchase patterns, 126 different questionnaires were used during the year.

Items included on these questionnaires have been selected, so far as information is available, on the basis of the importance of each individual commodity or service relative to total expenditures for the particular group of commodities and services in its category. Infrequent farm expenditure surveys provide the data basic to these selections. The most nearly complete of such surveys was conducted in 1956, and covered expenditures during the calendar year 1955. This survey was made by the Agricultural Marketing Service in cooperation with the Bureau of the Census, and covered farm production expenses on

7,300 farms and family living expenses on 4,300 farms. The Agricultural Research Service also cooperated in the handling of the family living inquiry, and was jointly responsible with the Agricultural Marketing Service for the collection of supplementary detail concerning food purchases from 2,000 additional rural farm families. Early in 1962 a further survey of the living expense segment of farmers' expenditures was conducted on another 2,100 farms by the Statistical Reporting Service in cooperation with the Bureau of Labor Statistics. Comprehensive coverage of the production component of the farm expenditure field has not been made for any year since 1955.

In the effort to reflect price changes over the complete spectrum of farm expenditures, major commodity groups have been set up—for example, commodities bought for family living are subdivided into food, clothing, furniture, and so on,

TABLE 8.—PRICES PAID BY FARMERS: *Frequency of surveys, regionalization and seasonality of questionnaires, number of commodities and times reported, independent stores, 1962*

Survey	Surveys per year	Questionnaires used		Commodities reported for specified number of months per year								
		Regional	Seasonal	12	9	6	5	4	3	2	1	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Food, tobacco, and household articles.....	4	1	4	---	---	---	---	16	16	12	33	77
Clothing and dry goods.....	4	1	4	---	---	---	---	25	13	17	16	71
Furniture, appliances, and floor coverings.....	4	2	1	---	---	---	---	53	---	1	---	54
Building materials, fencing materials, and fuel.....	4	5	2	---	---	---	---	64	---	9	---	73
Equipment, supplies, and marketing containers.....	4	7	4	---	---	---	---	19	7	12	41	79
Farm implements and machinery.....	4	8	4	---	---	---	---	10	---	55	61	126
Feed.....	12	4	3	36	1	5	---	---	7	---	---	49
Fertilizer and spray materials.....	2	12	2	---	---	---	---	---	---	54	12	66
Seed.....	5	1	3	---	---	---	14	11	5	---	17	47
Auto supplies and services.....	4	1	2	---	---	---	---	21	4	---	8	33
Autos and trucks ¹	3	1	2	---	---	---	---	---	13	30	---	43
Baby chicks and turkey poults.....	12	1	1	8	---	---	---	---	---	---	---	8
Telephone and electricity.....	1	2	---	---	---	---	---	---	---	---	2	2
Total.....	63	46	32	44	1	5	14	219	65	190	190	728
Commodities duplicated.....	---	---	---	---	---	---	---	4	2	1	2	9
Net total.....	63	46	32	44	1	5	14	215	63	189	188	719

¹ Surveyed more frequently if changes occur in retail prices suggested by the manufacturer.

and those bought for production into feed, fertilizer, machinery, and so on—as already described. Within each such grouping, further subgroupings have been made. For example, food items may be divided into meat, poultry, fish, fats and oils, dairy products, eggs, cereal and bakery products, vegetables, fruits, sweets, beverages, tobacco (an anomalous classification included with food items for the reason that tobacco products are frequently sold by grocery stores—an item too important to be omitted but not sufficiently important for a separate classification). Clothing may be divided into men's, boys', women's, and girls' clothing, and yard goods; and into cotton, wool, and synthetic fabrics, footwear, and leather goods. Within each such category, the more important items—to the extent information is available—have been included among the commodities priced. Because the number and variety of commodities is seemingly almost limitless, as a practical matter commodities are generally omitted that account for an expenditure of less than one-half of 1 percent of the total annual expenditure of the group to which it belongs.

Simple averages of the prices voluntarily reported are computed separately for independent and chain stores for each item, by States. These averages provide the basis for State estimates of average prices paid by farmers on each reporting date. Generally speaking, reports are received from independent stores in each State. (See fig. 40.) Although the geographic coverage is not as complete for chain outlets, the practice of warehouse area pricing by national and regional chains, and the normal relation between chain and independent store prices for a given item provide a basis for price estimates, by type of store, in all States having a weight in the United States average. These price estimates are then weighted in proportion to the estimated relative volume of sales to compute a combined average for the dates when both types of stores are circularized for information. For categories of products customarily merchandised by both independent and chainstores, the independent stores are circularized quarterly, and the chain outlets each month. The monthly series of estimates of prices paid to chainstores furnish the basis for extrapolating many of the quarterly subgroup index

components of the Parity Index in interquarterly months.

Independent store averages are weighted geographically within the State only in cases where there is extreme variation in the intensity of usage (for example, turkey grower mash) from one part of the State to another. Prices of farm machinery and automobiles are stratified by make and model; and prices of packaged goods (food, for example) by size of package in a few instances. Prices of mixed dairy and a few other feed items also are stratified by protein content within some States.

National price estimates are weighted averages of State price estimates, the weights representing the estimated expenditures for such items in the respective States. The 1955 Farm Expenditure Survey provides the most recent basic data, by regions, for this purpose. The weights reflect a blend of farm population and net farm income as the basis for a breakdown of weights for consumer goods by States within regions; a blend of either crop production, livestock numbers, or number of farms with cash farm income provides a basis for the breakdown of estimated weights for prices of production goods, by States, within regions.

Prices Paid Indexes

The important available series of prices paid by farmers are summarized currently by the Statistical Reporting Service in index number form. The Index of Prices Paid by Farmers, Including Interest, Taxes, and Farm Wage Rates (defined legally as the Parity Index) supplies a measure of average change over time in average prices of commodities and services commonly bought by farmers. It is used extensively by economic analysts, by farm organizations, by legislators, and by Department of Agriculture officials, not only as a general economic measure of price movement in an important sector of the economy, but also to provide general guidelines in farm policy legislation and administration. The base period for this Index is set at 1910-14 by law.

There are five major components or groups of commodities and services that comprise the Parity Index. The first group consists of commodities used for family living; the second, of those used in farm production. Together, the farm produc-

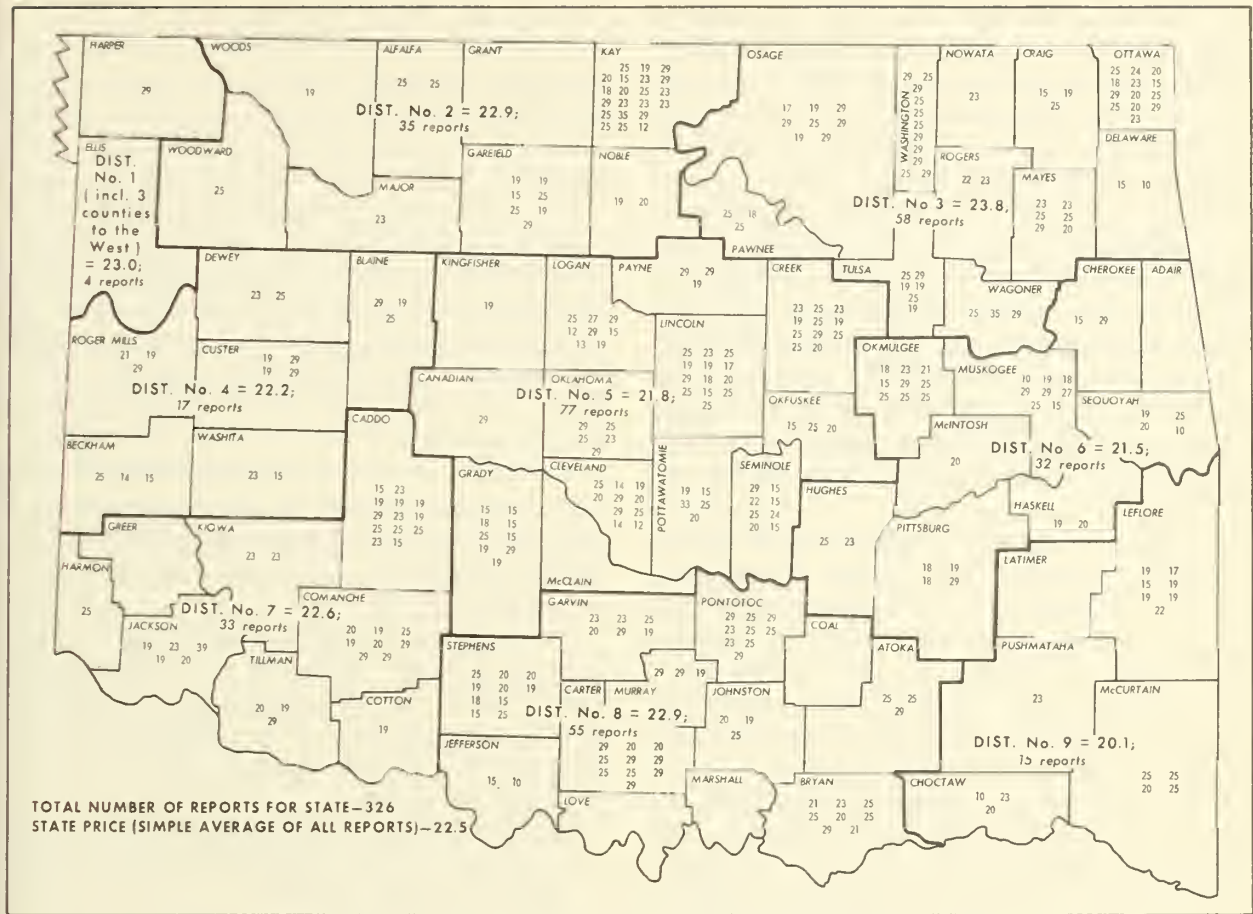


FIGURE 40.—Oklahoma, prices paid for tomatoes by farmers, cents per pound, September 1962.

tion and family living indexes comprise the Index of Prices Paid by Farmers for Goods and Services. The remaining three components are (a) interest charges per acre on mortgage indebtedness secured by farm real estate, (b) taxes payable per acre on farm real estate, and (c) wages paid to hired farm labor.

These five major components provide a reasonably satisfactory representation of approximately 83 percent of farmers' expenditures. Of the expenditures not so included, those for medical and dental care, including hospitalization, amounting to around 4.7 percent of total farmers' expenditures, are the most important. As already noted, no adequate existing source data are available for measuring either the level or change in the prices involved in these expenditures by farmers or even by residents of rural areas generally.

Other areas for which it has not been possible to develop data sources for use in the Index are insurance rates (life, accident, crop), interest costs, other than those relating to farm mortgage debt, and taxes other than on farm real estate.

In January 1959, the Index of Prices Paid by Farmers was revised. This revision reflected the findings of the most comprehensive investigations of farm expenditures ever undertaken by the Department. Specific structural outlines were supplied by a nationwide Farm Expenditure Survey and a Food Consumption Survey (p. 165). Data provided by these surveys formed the primary basis for the weighting pattern of the revised index. In addition, other sources of official information of the Department were used, particularly data relating to interest on farm real estate indebtedness, taxes on farm real estate, annual

estimates of fertilizer consumption, and various estimates of livestock. Commodities previously used in the construction of the indexes were reviewed in the light of the updated expenditure information. Items whose importance had dwindled to less than one-half of 1 percent in farmers' expenditures for a given category of commodities and services (food, clothing, etc.) were in general dropped from the index; new items that had become important in the farm purchase pattern were added. Overall item coverage was increased substantially, owing to the availability of price series and to the broader coverage of individual goods and services indicated for 1955 by the survey of farm family expenditures.

Currently, the weighting pattern of the Index, commodity coverage, and format of questionnaires are reviewed and evaluated periodically to keep the various index commodities representative, insofar as possible, of current farm purchasing practices. At the same time, consideration is given to further refinement of specifications and regionalization of mailed inquiries.

For most commodities comprehensive data concerning farm purchase patterns are available only at rare intervals. A notable exception is fertilizer, for which annual data on sales are available. Grades of fertilizer used in different geographic areas of the country vary considerably at any one period of time. Also, over a period of years, the use of grades within areas changes materially. Therefore, a constant effort is made to price those grades used most commonly or in greatest volume in each State from year to year.

Similar problems are encountered when other commodities are priced. Up-to-date information on the extent of changes in purchasing patterns for individual commodities is utilized to the extent that it is available; group weights used in the computation of the indexes are based on the 1955 expenditure data. Updated farm expenditure surveys similar to the general inquiry conducted for 1955 should be made at least once every decade, or, preferably, every 5 years.

The formula used for computing these prices paid indexes is basically an aggregate type, modified from the Laspeyres formula. The computation procedure involves linking together a series of indexes, each of which has a different base

period. The half century covered by the Index was divided into shorter periods as nearly homogeneous as possible, insofar as the availability of detailed expenditure data permitted. Indexes computed for each period, using the most representative weights available for this period, are linked together. For the period September 1952 to date, weights derived from the Farm Expenditure Survey covering the year 1955 were used; for March 1935 to September 1952, weights used represented estimated purchases made annually by farmers from 1937 to 1941; and for 1910 to March 1935, estimated annual purchases during the 6 years 1924-29 were the basis for weights.

Currently, indexes are computed first on a 1955 base (the year covered by the Expenditure Survey) and then converted to the 1910-14 base by linking this series to the 1910-14 index as of September 15, 1952.

To provide for comparability with other major indexes—most of which are on a 1957-59=100 base—indexes are also converted to the 1957-59 base by dividing each of the official indexes on a 1910-14 base by the average index (1910-14=100) for that period.

Modifications in the formula also permit adding or dropping items from the index as certain commodities become obsolete or gain in importance over the years. In September 1962, for example, cottage cheese was added to the food price index for the first time. Before that date, its weight has been imputed to the price series for American cheese. Based on available expenditure data, it has been estimated that the outlay of the average farm family for all types of cheese would have purchased 36.1 pounds of American cheese in 1955. At 62.5 cents a pound, this quantity of American cheese cost \$22.56 in September 1962, when the new series of cottage cheese prices became available. To improve the representation of cheese prices in the food price index, the "other cheese" expenditure imputation was broken out of the total for American cheese and assigned to cottage cheese at that time. Thus, on the basis of 1955 purchase patterns, the annual per farm outlay for American cheese, in terms of September 1962 prices, amounted to only \$17.94, and the remaining \$4.62 was assigned to cottage cheese. Dividing the \$17.94 by the September 1962 American cheese price of 62.5 cents

resulted in a new weight of 28.7 pounds. Similarly the \$4.62, divided by a 25-cent price of cottage cheese, resulted in a quantity weight of 18.5 twelve-ounce packages for this new price series. The end result is an adjustment in commodity weights which leaves the sum of the product of the respective item weights multiplied by the prices of the new commodity consist identical to the product of weight and the price for the old item. Thus, the level of the index is not disturbed at the time of the change, and thereafter the new price series bears its proportionate influence on the index level.

Sampling Problems

As consumers, farmers—like nonfarmers—buy a wide variety and a great number of different commodities; the total number is perhaps on the order of 150,000. As producers, they buy perhaps 25,000 others for their farm operations. The measurement of price change in such an ocean of items is a stupendous undertaking.

This undertaking is complicated by the fact that most of these items are bought through a great variety of outlets. Food, for example, is bought from supermarkets, chainstore outlets, independent stores, delicatessens, food specialty stores, roadside markets, fruit stands, dairies, department stores, and doubtless others. Clothing is bought at men's clothing stores, women's clothing stores, specialty shops, discount houses, and mail order houses; even supermarkets now carry limited lines of clothing. Auto supplies are sold not only by garages, gas stations, tire stores, auto dealers, and automobile equipment houses, but by some department stores, mail order houses, and even some drug stores.

Farmers buy some of these supplies in large cities, but many more in medium-sized and small cities or towns.

Collection of price information on all such items in all outlets would be impossible, excessively expensive for even approximate coverage, and unnecessary, for reasonably satisfactory measurement of price movements is possible by use of a well chosen sample of commodities and outlets. On the basis of the resources available, pricing of a little more than 650 more important items is possible.

The object of the price data collection program of the Statistical Reporting Service is to ascertain at intervals—monthly for a core of basic commodities, and less frequently for others—the average price paid by farmers for about 650 specific items, such as round steak, men's suits, men's shoes, automobiles, during a specified 5-day pricing period at the middle of each month. Ideally, this means that the sampling frame should be such as to include all sources through which farmers bought any of the designated commodity during the pricing period, and that the sample design should give to each unit of the commodity sold an equal or assignable probability of selection. Operationally, it requires that prices paid (not merely list prices) be collected in all States, summarized, and published by States, with regional and national averages, not more than 2 weeks after the initial date of collection.

Obviously, rigorous fulfillment of the ideal specification is impossible of attainment. The repetitive and timing characteristics of the pricing operation alone preclude the assembly of the prior information as to quantities of each item to be purchased at each outlet during each particular 5-day period that would be required for designing a theoretically perfect probability sample for pricing each month.

The practical problem, therefore, is to reach a set of compromises that will substantially meet the theoretical requirements on an operationally feasible basis to meet the given timing, and at the same time provide substantial representation of each important stratum of the market organization for each group of commodities.

This would seem to require information on the volume of different commodity groups (food, for example) sold to farmers by the several types of stores selling to farmers. Geographical stratification, within the United States and within States, would seem a minimum requirement because of regional price variations. Stratification by States is indicated also by operational and organizational requirements.

To some extent, commodity specification provides a means of stratification. For example, since it is the policy not to publish prices by brands or manufacturers, prices paid by farmers for automobiles are in terms of (a) new, six-

cylinder; (b) new, eight-cylinder; (c) used. This requires pricing of several makes for each category, and weighting the prices for each make into a class average. Such weighting would require information concerning the quantities of the various makes of autos in the six- and eight-cylinder categories, by geographical breakdowns. The same is true of many items.

Even a compromised stratified probability sample would obviously require a vast amount of preparatory information much of which cannot possibly be made available before the pricing date. The best that can be done is to use recent historical information—and even this is difficult enough to acquire in the detail needed for a theoretically satisfactory design.

The design of a good sample, however, is only the starting point. The collection of good price data requires securing valid reports from the selected sample. The use of mail questionnaires seldom achieves anything approaching 100 percent response, and any serious deficiency carries with it the possibility of selectivity in response. Thus, to preserve the integrity of a sample requires a followup—which, if made by mail, again is likely to elicit only partial response. Only by direct personal enumeration can reasonably complete response be guaranteed. Even with enumeration, some small nonresponse is almost inevitable.

There is another class of problems involved in securing valid prices, namely, the difficulty of obtaining data on the true selling price of items sold below or above the list price. This problem arises mainly with more expensive items administratively priced by the manufacturer—items such as automobiles, machinery, and refrigerators. In a sellers' market, buyers not infrequently find it necessary to pay a bonus over the list price to secure delivery. In a buyers' market, sellers often offer substantial discounts from the list price in order to make a sale. In either situation the dealer prefers not to report the true price.

Ideally, sales documents are preferred source material, but dealers all too frequently decline to grant the privilege of an examination of these records. The collection of actual transaction prices under such conditions requires the greatest tact and skill. The greatest success in such situations is likely to attend the personal contact by

an enumerator who has established rapport with the dealer.

In practice, the resources necessary for operation of a probability sample together with the procedures for insuring virtually complete response have not been available, and it has been necessary to do the best job possible by use of a mail approach. For automobiles, it has been possible in recent years to use a very limited application of probability sampling and direct enumeration, but for most of the 600 or so items priced replies to the mail questionnaire have been the primary source of data. Since return of a mail questionnaire is purely voluntary on the part of the reporter, and since a 30- to 50-percent return is not far from par for a well-maintained list, the samples of reporters are those whose cooperation it has been possible to maintain, rather than those deliberately selected by a specific process.

Consequently, in the operation of the data collecting organization, the effort has been to secure as good area representation as possible, using letters designed to promote cooperation and sending questionnaires to new lists in the hope of expanding coverage. In some cases, it has been possible for representatives of the field offices to interview prospective reporters, explain the use of the data, and invite cooperation. Such efforts are usually the most effective means of improving response.

Wherever selectivity and lack of continuity in reporting are evident, special care is required in interpreting the results.

PARITY PRICES

"Parity," as related to agricultural prices, is a standard used to measure the degree to which farm product prices are in line with what Congress has defined as a fair goal or objective.

Background and Scope

It has long been recognized that the economic health of agriculture cannot be measured solely by the level of farm product prices. A fundamental requirement in determining farmers' well-being is what farm products will buy in terms of food, clothing, feed, machinery, and other commodities and services that farmers need to carry on production activities and to maintain a living

standard comparable to that of the United States economy generally.

Congress recognized the necessity for such a measure in the Agricultural Adjustment Act of 1933. That Act, passed during one of the worst depressions in the history of the Nation, declared it to be the policy of the Congress to "reestablish prices to farmers at a level that will give agricultural commodities a purchasing power with respect to articles that farmers buy, equivalent to the purchasing power of agricultural commodities in the base period."¹¹ Parity prices have come to be the most commonly used parity standard; that is, the prices that will give a unit of a farm commodity the same purchasing power, or exchange value in terms of goods and services bought by farmers, as it had in a selected base period, during which these price relations were considered to be in reasonably good balance. In short, parity prices are widely accepted as a yardstick for determining how close prices received by farmers are to the prices Congress has defined as an objective.

The parity price formula does not measure cost of production, standard of living, or income parity. It is based on price relations which, of course, are only one component of cost of production or income.

Parity income has also been prescribed as a goal of agriculture, and definitions of it have been incorporated in agricultural legislation, such as the Agricultural Act of 1948.¹² But parity in-

come has never been adopted as a criterion in the operation or administration of any agricultural program, largely, no doubt, because of the difficulties involved in doing so.

Parity prices are computed in terms of prices received by farmers in the local markets in which they ordinarily sell. Inasmuch as prices received by farmers generally relate to the average of all classes and grades of a commodity sold by farmers, the same is true of parity prices. Parity relates to the Nation as a whole; parity prices are not computed by States or grades or for specific markets. However, to meet the operating needs of some of the price programs, differentials are determined for grade, location, or season. Differentials may be applied to the national average parity price to determine the "parity equivalent" for a specific grade or location. They are more often applied to the national average price-support level to determine the support price for specific grades at particular locations, or season.

Base prices used in calculating parity prices are averages of prices received by farmers during several years; therefore, any seasonal element is largely averaged out. Prices received by farmers for eggs and wholesale milk, commodities that have a strong or regular seasonal movement, are adjusted for seasonal variation before they are compared with the corresponding parity prices.

Two principal refinements in the legislative definition of parity have been made since 1933. They are:

1. The inclusion of interest on mortgage debt secured by farm real estate, taxes on farm real estate, and, since January 1950, wages paid hired farm labor in the index of prices paid by farmers used in computing parity prices.

2. The reflection into the base period prices for individual commodities of price relations during the most recent 10-year period in such a manner as to retain 1910-14 as the reference point for expressing equality between prices received for farm products and prices paid by farmers.

Uses of Parity Prices

Parity prices have played an important part in agricultural policy for nearly three decades. It is, of course, only when action programs based on parity prices are in operation that prices received

¹¹ Certain sections of this Act were declared invalid by the Supreme Court (*U.S. v. Butler*, 297 U.S. 1), but the section quoted, in nearly identical language, was reenacted in the Agricultural Marketing Agreement Act of 1937 (Public Law 137, 75th Cong., approved June 3, 1937) and a similar policy statement was contained in the Agricultural Adjustment Act of 1938 (Public Law 430, 75th Cong., approved February 13, 1938).

¹² "Parity," as applied to income, shall be that gross income from agriculture which will provide the farm operator and his family with a standard of living equivalent to those afforded persons dependent upon other gainful occupations. 'Parity,' as applied to income from any agricultural commodity for any year, shall be that gross income which bears the same relationship to parity income from agriculture for such year as the average gross income from such commodity for the preceding ten calendar years bears to the average gross income from agriculture for such ten calendar years." (Public Law 897, 80th Cong., approved July 3, 1948.)

by farmers are appreciably affected by them. But over the three decades since 1933, farm income has been augmented by many millions of dollars through programs depending in part on parity prices.

Following are some of the more significant uses of parity prices:

1. To provide a basis for measuring changes in the purchasing power of a commodity. A comparison of the price actually received by farmers for a commodity with the parity price gives a measure of the change in the purchasing power for that commodity. This was the principal purpose the parity concept was originally intended to serve and it remains one of the important uses.

2. To determine support price levels. Legislation requiring or authorizing the United States Department of Agriculture to support prices of agricultural commodities does not usually specify the dollars-and-cents prices at which the commodities are to be, or may be, supported. Instead, for some commodities, legislation indicates a specific percentage of parity, or a range in percentage of parity, at which the commodity must or may be supported. The United States support levels usually are announced both in percentages of parity price and in dollars and cents. Before a support program is put into operation, differentials from the United States average support price are generally established for various grades and locations and, if necessary, for seasonal considerations.

3. For marketing agreement and order programs. Parity prices also relate to the administration of marketing agreements and orders for fruits and vegetables. The Agricultural Marketing Agreement Act of 1937, as amended, provides for the regulation of marketings of some agricultural commodities such as fresh fruits, fresh vegetables, potatoes, tree nuts, and hops by means of marketing agreements and orders. Operations under such marketing orders cannot be continued after the price of the commodity reaches parity except as needed (1) to maintain minimum standards of quality and maturity and such grading and inspection requirements as are in the public interest, or (2) to provide, in the interest of producers and consumers, an orderly flow of the

supply to market to avoid unreasonable fluctuations in supplies and prices.

Parity prices were used during World War II as one of the criteria in determining the lowest point at which to set price ceilings; they were used again for similar purposes during the Korean emergency.

The Emergency Price Control Act of 1942, as amended, provided that no ceilings on prices should be established or maintained for any agricultural commodity below the higher of the following prices as determined and published by the Secretary of Agriculture: (1) The parity price, or where applicable, the comparable price, or (2) the highest price received by producers for such commodities between January 1 and September 1, 1942. The Defense Production Act of 1950 provided that price ceilings on agricultural commodities could not be established at less than the legal minimum price, which was generally the pre-Korean price or the most recent parity price.

Calculation of Parity Prices

Parity prices are computed under the provisions of Title III, Subtitle A, Section 301(a) of the Agricultural Adjustment Act of 1938 as amended by the Agricultural Acts of 1948, 1949, 1954, and 1956. The major provisions of the amended Act relating to the calculations of parity prices are as follows: "(1) (A) The 'parity price' for any agricultural commodity, as of any date, shall be determined by multiplying the adjusted base price of such commodity as of such date by the parity index as of such date.

"(B) The 'adjusted base price' of any agricultural commodity, as of any date, shall be (i) the average of the prices received by farmers for such commodity, at such time as the Secretary may select during each year of the ten-year period ending on the 31st of December last before such date, or during each marketing season beginning in such period if the Secretary determines use of a calendar year basis to be impracticable, divided by (ii) the ratio of the general level of prices received by farmers for agricultural commodities during such period to the general level of prices received by farmers for agricultural commodities during the period January 1910 to December 1914,

inclusive. As used in this subparagraph, the term 'prices' shall include wartime subsidy payments made to producers under programs designed to maintain maximum prices established under the Emergency Price Control Act of 1942.

"(C) The 'parity index', as of any date, shall be the ratio of (i) the general level of prices for articles and services that farmers buy, wages paid hired farm labor, interest on farm indebtedness secured by farm real estate, and taxes on farm real estate, for the calendar month ending last before such date to (ii) the general level of such prices, wages, rates, and taxes during the period January 1910 to December 1914, inclusive.

"(D) The prices and indices provided for herein, and the data used in computing them, shall be determined by the Secretary, whose determination shall be final.

"(E) Notwithstanding the provisions of subparagraph (A), the transitional parity price for any agricultural commodity, computed as provided in this subparagraph, shall be used as the parity price for such commodity until such date after January 1, 1950, as such transitional parity price may be lower than the parity price, computed as provided in subparagraph (A), for such commodity. The transitional parity price for any agricultural commodity as of any date shall be—

"(i) its parity price determined in the manner used prior to the effective date of the Agricultural Act of 1948, less

"(ii) 5 per centum of the parity price so determined, multiplied by the number of full calendar years (not counting 1956 in the case of basic agricultural commodities) which, as of such date, have elapsed after January 1, 1949, in the case of nonbasic agricultural commodities, and after January 1, 1955, in the case of the basic agricultural commodities."

Section 301(a)(1)(F) outlines authority for the Secretary of Agriculture to make special adjustments in the method of computing parity prices for particular commodities if the method outlined in the Act results in parity prices seriously out of line with those of other commodities. The authority conferred by this section has been invoked only once, and that in the case of Connecticut Shade Grown Tobacco. In that case, the effect of the action was to raise the parity price.

For commodities not on the modernized basis, parity prices are computed by both the "old" and the "new" formulas. The Effective Parity Price—that is, the official parity price to be used for making determinations needed for price support or other programs—is then the higher of the following:

(1) The parity price computed under the "new" formula outlined in the amended Act, or

(2) The transitional parity price (as described in paragraph "(E)"). During 1964 the transitional parity price for nonbasic commodities is 25 percent of the "old" formula parity. Basic commodities completed transition to the modernized basis in January 1960 at which time corn and Puerto Rican tobacco shifted to modernized parity.

Effective parity prices are based on the provisions of the amended Act. The actual method of computation under the new formula is as follows:

a. The average of prices received by farmers for individual commodities for the 10 preceding years is calculated (for 1964 this is the 1954–63 average). An allowance for unredeemed loans and other supplemental payments resulting from price support operations are included for those commodities for which applicable.

b. This 10-year average is divided by the average of the Index of Prices Received by Farmers for the same 10 preceding calendar years, adjusted to include an allowance for unredeemed loans and other supplemental price support operations, to give an "adjusted base price."

c. Parity prices are computed by multiplying the "adjusted base prices" by the current Parity Index (the Index of Prices Paid by Farmers, including Interest, Taxes, and Farm Wage Rates with 1910–14 = 100). This index is published in Agricultural Prices each month.

For dates, the only commodity not on the modernized basis as of July 1964, the transitional parity price is calculated by first computing the parity price according to the "old" formula. The "old" formula base price uses the period August 1924–July 1929, since satisfactory price data were not available for the 1910–14 period. This base price is multiplied by the unrevised Index of Prices Paid by Farmers (excluding interest and taxes) converted to the 1924–29 base period. This

conversion is made by dividing the 1910-14 Index by 1.54. In 1964, transitional parity for dates is 25 percent of the "old" parity price.

In January 1950, when the "Modernized Parity" became effective, 115 of the approximately 170 commodities for which parity prices were computed went immediately to the new basis. For the remainder the Transitional Parity

Price became the effective parity. As of July 1964, all but one of the 170 commodities for which parity prices were computed—dates—had made the transition.

Table 9 shows the indicated parity prices computed by both the old and new formulas, the transitional parity prices, and the effective parity prices for avocados and dates as of July 1964.

TABLE 9.—*Indicated parity prices, "old," "transitional," and "new," and effective parity prices for avocados and dates, based on data for July 1964, United States*

Commodity	Unit	Old formula	Transitional parity prices ¹	New formula	Effective parity prices based on data for January 1964
		<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>	<i>Dol.</i>
Avocados.....	Ton.....	1, 120. 00	280. 00	284. 00	284. 00
Dates.....	Ton.....	647. 00	162. 00	157. 00	162. 00

¹Transitional parity for nonbasic commodities is 25 percent of parity price computed under old formula in use prior to January 1, 1950.

Publication of Parity Prices

The Statistical Reporting Service publishes monthly in Agricultural Prices parity prices for approximately 170 agricultural commodities.¹³ Monthly publication of parity prices for the more important commodities was begun in September 1933,¹⁴ but calculations of parity prices for many of the minor commodities were not made until June 1942. With the exception of May and June 1953, the complete list of parity prices has been published each month since January 1951. Prior to that time they were published at 6-month intervals. For each major commodity, Agricul-

tural Prices presents the "percentage of parity," that is, the current U.S. average price received by farmers divided by its respective parity price. The parity prices compiled on the basis of data for any month are the legally applicable parity prices for the following month. For example, parity prices computed from prices for June 1964 were the legally applicable parity prices for July 1964.

Since September 1950, the policy followed by the Statistical Reporting Service (then part of Agricultural Marketing Service) is that a parity price for a commodity once published is not subsequently revised. Thus the parity price published in the current month continues to be the official parity price for that month, even though the index numbers of the basic price series used in its computation may subsequently be revised.

FARM WAGE RATES AND LABOR

Farmers and their hired workers provide food and fiber for added millions each year with such regularity and abundance that plentiful supplies are taken for granted. The accounting of the people who grow the food we live by is an essential part of the statistics of agriculture.

¹³ For purposes of parity price computation and use, an "agricultural commodity" is any commodity for which the U.S. Department of Agriculture calculates a parity price.

¹⁴ Publication of parity prices was discontinued in March 1936 as a result of the Supreme Court decision (*U.S. v. Butler*, 297 U.S. 1), which declared certain provisions of the Agricultural Adjustment Act of 1933, as amended, unconstitutional. Publication was resumed in September 1938 following the reenactment and amendment of the parity price provisions in the Agricultural Marketing Agreement Act of 1937 and the Agricultural Adjustment Act of 1938. (Public Law 137, 75th Cong., approved June 3, 1937; and Public Law 430, 75th Cong., approved February 16, 1938.)

Reports on farm employment first collected by the Department mainly related to supply of and demand for farmworkers and resulting wage changes. From 1919 to 1923, reports presented the supply and demand for farm labor in percent of normal by geographic divisions. Beginning in 1923, data were obtained on the number of farm family workers and hired workers employed on farms of crop reporters. Publication was made in terms of averages per farm. Estimates of the number of persons working on farms were first published in 1938, covering the period 1910-36. The series was placed on a revised basis in 1948, using definitions of farm employment which have been followed since that time. State estimates were first published in 1958, covering the years 1950-57. The complete series available at this time thus gives (1) annual average estimates of total U.S. farm employment from 1910 to date; (2) monthly estimates (one designated week each month) from 1940 to date for the United States and for nine major geographic divisions of the country; (3) monthly and annual averages by States from 1950 to date. Separate estimates are shown for farm family workers and hired farm workers. Statistical Bulletin 334, July 1963, shows State estimates of annual average farm employment for 48 States for the years 1950-59, including revisions for 1953-59. Revised monthly estimates, 1959-62, were published in the March 1963 issue of Farm Labor. Current issues of Farm Labor present monthly estimates on the revised basis.

The basis used to define farmworkers in the SRS series is important to an understanding of the level of these estimates. Farm employment is defined as employment on places considered by the Department as farms. Persons represented in estimates for survey weeks include (1) operators doing any work on their farms, (2) members of operators' families who work 15 hours or more on the farms without receiving cash wages, and (3) all hired workers doing farmwork for pay (1 hour or more).

The "benchmark" basis for the numbers of these kinds of farmworkers has been mainly the enumerated totals of inquiries made in the U.S. Censuses of Agriculture. Information bearing on more precise definitions of farmwork and farmworkers is shown in the specific instructions sup-

plied census enumerators, of which the 1959 census instructions are an example:

"Include as farm labor any work, chores, or planning necessary to the agricultural operations of the place, such as the following:

Working in fields, orchards, or home gardens.

Feeding and caring for livestock and poultry.

Irrigating crops.

Hauling farm products from this farm to market.

Hauling feed, fertilizer, and other supplies to the farm or ranch.

Cleaning and caring for milk pails and separators.

Maintaining and repairing machinery and other farm equipment.

Regular farm help used in constructing or repairing farm buildings and fences.

Contract farm work for which labor is hired, but for which machines and equipment are furnished by the farm operator.

Contract work done by persons supplied by a labor contractor or by cooperative organizations such as a citrus cooperative.

Planning farm or ranch work.

Keeping farm or ranch records.

Supervising hired farm employees.

Cutting firewood, fenceposts, timber, pulpwood, etc., except by persons specifically hired for this purpose.

"Do not include:

Housework.

Contract construction work.

Custom work for which equipment and operating labor are hired such as custom combining, hay baling, etc.

Repair, installation, or construction work done by persons employed specifically for such work".

The extent to which the time spent in such farm management activities as planning and recordkeeping may be considered in the census or in farmer reports to the Statistical Reporting Service is undetermined. It should be noted, however, that the series tends towards a relatively high indication of number of persons working. This comes through (1) including operators who report any work on their own farms, even though a substantial or even a major part of their time may be spent at other occupations, (2) including some children under 14 years of age among the unpaid family members working 15 or more hours per week, (3) reports of hired workers which may involve some duplication of short-term and migratory workers who work on more than one farm during the period covered in the enumeration. The conceptual framework of the series provides a measure for comparing the number of

persons doing farmwork in different periods which is of value in indicating trends of labor use. It should be recognized, however, that the worker estimates as presented do not in themselves measure with precision the changes in total amount of farm labor devoted to farming. It is possible for operators to pass from full time to part time farmwork without changing their reporting status as farmworkers. Also, the number of unpaid family workers and hired workers included at different seasons may contribute varying amounts of labor.

The general approach used in estimating the number of farmworkers is to estimate from a sample basis the average number of family and hired workers per farm during a given survey period. These averages multiplied by the number of farms in each State produce State estimates of the number of farmworkers. The basic data are replies received each month from nearly 30,000 monthly Farm Report respondents. These responses show generally stable seasonal farmwork patterns and appear to represent the labor on reporting farms with reliability. These samples, however, are composed of voluntary reporters who generally have somewhat larger operations than average. The respondents to the monthly Farm Report, in some States at least, tend to overrepresent general farms or combined crop and livestock farms and may fail to represent properly the changes in seasonal hired labor on fruit and vegetable operations. Because of these characteristics of the Farm Report samples, which vary by States, it is necessary to adjust the reported averages of workers per farm to levels to represent averages for all farms before deriving indicated worker totals for a given State. Sample averages for operators and other family workers require less adjustment to reach the average for all farms indicated by benchmark data than do the sample averages for hired workers in most States.

Much attention is being given to methods of estimating farm employment which will reduce the amount of adjustment required in the derivation of estimates of the number of family and hired workers. Studies of relation by type and size of farm appear promising. Attempts also are being made in some States to utilize and develop data on numbers of short-time or seasonal workers in cooperation with State Employment Secu-

rity Agencies for combination with data for long-term hired workers determined from monthly Farm Report samples. Current studies of the relations of sample farms to all farms are being encouraged to lessen reliance on factors based on regional data available from the enumerative farm labor surveys conducted in 1945, 1946, and 1947.

Contribution of Interview Surveys

The June enumerative surveys made by the Statistical Reporting Service to develop estimates of crop production, livestock numbers, and other data by enumeration of area samples have been increasingly useful in providing information on farm labor. Data from these surveys are useful in revising seasonal indications of workers per farm and in indicating changes in hiring arrangements. The selection of sample farms by probability sampling techniques has afforded an estimate for some States for comparison with estimates obtained from Farm Report data in late May. Such information is greatly needed for guidance because the Census of Agriculture data on farm employment are available only for one week in a 5-year period, usually after most fall harvests have been completed or nearly so. Extension of periodic enumerative surveys in all 48 conterminous States will aid in further improving the farm employment series.

Data on hours worked by operators, other family, and hired workers in survey periods in late May have been compiled in the enumerative surveys since 1957, although the small size of the sample in many States has limited the precision of the data. As the sample size reaches an operating level in most States, the data therefrom are expected to be of substantial value with respect to the reports on farm employment. Beginning in 1963, farm operators are requested on the Farm Report to report hours worked during survey weeks, instead of the former item of days worked which served to indicate the number of working operators. Reports of average length of farm workday were terminated with the year 1961. Comparisons with enumerative survey data on hours worked provided evidence that this series, especially for operators, represented workday lengths that were too long for averages for

all farms as purported. The number of hours that hired labor and "other family" labor worked during the survey week preceding are now being asked on the monthly Farm Reports in all months. This development has resulted in large part because of data from the current interview surveys.

Farm Wage Rates

The farm wage series of the Statistical Reporting Service started in 1866. From that date through the early 1900's the wage-rate surveys were not made regularly; 19 surveys were made in the 42-year period ending in 1908. From 1909 to 1923 one survey was made each year. Since 1923, wage-rate data have been collected quarterly—on January 1, April 1, July 1, and October 1. The source of information in all years has been mailed inquiries directed to voluntary reporters.

The inquiries request reporters to supply "average rates being paid to hired farm labor in your locality." U.S. averages of cash wage rates are published for nine different hiring arrangements: per month with house, per month with board and room, per week with board and room, per week without board or room, per day with house, per day with board and room, per day without board or room, per hour with house, and per hour without board and room. A composite or weighted average rate per hour also is computed by converting the monthly, weekly, and daily rates to an hourly basis and weighting the rates by approximate distributions of workers hired by different arrangements. The composite rate per hour, adjusted for seasonal variation, is one of the components of the Parity Index, a shorter name for the Index of Prices Paid by Farmers for commodities and services, including Interest, Taxes, and Farm Wage Rates. Questions relating to farm wage rates were revised in 1948 to include more hiring arrangements and to specify more clearly the principal perquisites furnished in the hiring arrangements in addition to cash wages. In 1948 the composite rate was first placed on an hourly basis; prior to 1948 the composite rates were on the basis of dollars per month. In addition to average wage rates on the quarterly report dates—January 1, April 1, July 1, and October 1—annual average rates are computed. These reflect both the changes in levels of rates

reported and changes in estimated employment of hired workers in different types of employment. Although some kinds of perquisites, such as monthly housing and meals, are mentioned in the hiring arrangements specified, the wages reported include cash payments only; the value of perquisites is not included.

The broad representation of farmers reporting going wage rates in their localities and the stability of this large group of reporters has made the wage rate series a useful measure of wage trends in agriculture. It is recognized, however, that further sources of data and further expansion of types of rates are desirable in some States. The rates requested may not represent all hiring arrangements which are important. This is especially true in specialized operations which often are performed on a piece rate basis. The Department series does not report equivalent hourly rates of piece rate workers. However, an estimate for piece rate workers at the average rate per hour without board or room is included in the computation of the composite hourly rates.

The nature of other inquiries made on the monthly Farm Report makes this report of primary importance to operators of general-type farms having common crops, livestock, and poultry. This, in some States, may result in underrepresentation of vegetable, fruit, and some other specialized operations which may employ varying numbers of seasonal workers. Although reporters are asked to give average locality rates, there is some evidence that rates paid on their own farms and on farms of similar type are most completely represented, the term "locality" not being uniformly interpreted by reporters.

Efforts to improve the farm wage rate series which are now in progress aim at (1) reexamination of rates being reported, to insure inclusion of most important hiring arrangements, (2) use of up-to-date weights and conversions in computing State, regional, and U.S. averages.

The wage rate data are summarized in the offices of State Statisticians on a crop reporting district basis. The summaries and State recommendations are reviewed in Washington to aid in examining the consistency of trends. The work in Washington after adoption of the State rates for each hiring arrangement requested on the

State questionnaire consists of two principal processes:

1. The computation of regional and United States averages, which are weighted averages. Estimates of the number of hired workers employed are used for weights. Each individual type of wage rate is weighted by an estimate of the number of workers receiving that type of rate. Interview surveys are the source of percentages of workers, by regions, employed at each of the different types of rates during each season of the year. Before the regional averages can be combined to obtain a United States average, estimates of certain rates must be made, as not all rates are asked in all regions. These estimates are based on the relation between the rate to be estimated and the most nearly similar rate in regions in which both rates are reported.

2. Calculation of the composite rates. Since composite rates are published on an hourly basis, the monthly, weekly, and daily rates are converted to hourly equivalents. Conversion factors are the number of hours per month, week, or day put in by hired farmworkers who are paid each specific rate that is converted. Interview surveys furnish the data for use in preparing conversion factors. After wage rates other than hourly rates have

been converted to hourly equivalents, all rates are weighted together by the estimated number of workers receiving each type of rate. This process gives the hourly composite rate.

As data on wage rates are for the first of the month, it is necessary in preparing annual averages to weight the wage rates to center on July 1, the midpoint of the calendar year. To do this, January current rates are weighted by half of December employment plus that of January; April rates are weighted by February, March, and April employment; and so on through October. Wage rates for January 1 of the following year are weighted by employment for November and half of the December employment.

In addition to the regular series of wage rates, rates for picking 100 pounds of seed cotton have been collected since 1924. Cotton reporters are asked to give estimates for their locality of average rates paid for picking and for snapping or pulling cotton to November 1. These data are summarized in the State offices. In Washington, rates for snapping and pulling cotton are converted to picking rates. All rates are reviewed for reasonableness before publication in the November issue of Farm Labor.

APPENDIXES

APPENDIX A. EXHIBITS

Exhibit 1

C. E. 2-9693
"E"

Ill., Iowa

MARCH 1963 ACREAGE SURVEY

34

REPORT FOR THE FARM YOU ARE OPERATING

FALL AND WINTER SEEDED CROPS	Acres for harvest this year 1963	Acres harvested last year 1962
1. Winter wheat for grain		
2. Winter rye for grain		
3. Winter barley for grain		
SPRING PLANTED CROPS	Acres to be planted this spring 1963	Acres planted last spring 1962
4. Corn for all purposes (except sweet corn)		
5. Spring wheat		
6. Oats for all purposes		
7. Spring barley		
8. Flax		
9. Sorghums for all purposes		
10. Irish potatoes		
11. Soybeans for all purposes		
12. Other spring planted crops		
HAY CROPS	Acres to be cut for hay in 1963	Acres cut for hay in 1962
13. All hay (alfalfa and alfalfa mixtures; clover, timothy and mixtures of clover and grasses; grain hay; soybean; sweetclover; lespedeza; old meadows; reedtop; Sudan; orchardgrass; wild and marsh hay; etc.)		
ORCHARDS, PASTURES, ETC.	Acres in 1963	Acres in 1962
14. Land in fruit orchards and vineyards		
15. Acres in Conservation Reserve (Soil Bank)		
16. All other land, (pasture, idle, Feed Grain diversion, etc.)		
17. ACRES OF ALL LAND IN THIS FARM. (Include land rented from others)		

Reported by

County State
(In which farm is located)

[OVER]

16-51013-17

Exhibit 2

C. E. 2-9738
"E"

JUNE 1963 ACREAGE SURVEY

Illinois

REPORT FOR THE FARM YOU ARE OPERATING

CROP	Acres for harvest this year (1963)	Acres harvested last year (1962)
1. Corn for all purposes (except sweet corn)		
2. Wheat for grain		
3. Oats for grain		
4. Barley for grain		
5. Rye for grain		
6. Popcorn		
7. Sorghums for all purposes		
8. Irish potatoes		
9. Broomcorn		
10. Soybeans for beans		
11. Soybeans for hay and other purposes		
12. Alfalfa and alfalfa mixtures for hay		
13. Clover, timothy, and mixtures of clover and grasses for hay		
14. Lespedeza for hay		
15. All other hay		
16. Vegetable crops for processing and fresh market		
17. Land in fruit orchards and vineyards		
18. Other crops (not listed above)		
19. Land used for pasture only	Acres in 1963	Acres in 1962
20. Acres in Conservation Reserve (Soil Bank)		
21. All other land not reported above (Include Wheat and Feed Grain diversion)		
22. ACRES OF ALL LAND IN THIS FARM (Include land rented from others)		

Name

Post office R.
(Township)

County State
(In which farm is located)

[OVER]

16-51924-17

Exhibit 3

Exhibit 4

C. E. 2-9787
"G"

1962 ACREAGE SURVEY

Iowa

UNITED STATES DEPARTMENT OF AGRICULTURE
Statistical Reporting Service

Name

Post office R.
(Township)County State
(In which farm is located)

REPORT FOR THE FARM YOU ARE OPERATING

For crops show acreage harvested and to be harvested this year
(Read instructions on other side)

	Acres in 1962
1. Acres of all land in the farm you are operating (Include land rented from others)
2. Corn for grain, silage, fodder, pasture, and hogging off
3. Winter wheat for grain (harvested this year)
4. Winter wheat sown and to be sown this fall
5. Spring wheat for grain (harvested this year)
6. Oats for grain
7. Barley for grain
8. Rye for grain (harvested this year)
9. Rye sown and to be sown this fall
10. Mixed grains for grain..... \ Name mixtures /
11. Flax
12. Sorghums for all purposes
13. Irish potatoes
14. Popcorn
15. Soybeans for beans
16. Alfalfa and alfalfa mixtures, cut for hay
17. Clover, timothy, and mixtures of clover and grasses, cut for hay
18. Lespedeza cut for hay
19. Grains cut for hay (wheat, oats, barley, rye, etc.)
20. Other hay cut (old meadows, millet, Sudan, sweetclover, junegrass, redtop, wild, soybean, etc.)
21. Red clover cut for seed (include mammoth)
22. Sweetclover cut for seed
23. Timothy cut for seed
24. Smooth brome grass cut for seed
25. Vegetable crops for processing and fresh market
26. Other crops (not listed above)
27. Land in fruit orchards and vineyards
28. Land used this year for pasture only
29. Acres in Conservation Reserve (Soil Bank)
30. All other land in this farm (Include Feed Grain diversion)

[OVER]

16-53033-16

C. E. 2-9826

"A"

ACREAGE AND PRODUCTION OF GRAIN CROPS, 1962
REPORT FOR THE FARM OR PLANTATION YOU ARE OPERATING

Please report for each crop listed below the planted acreage and use made of the planted acreage. In reporting acres harvested and production, include acres that still remain to be harvested and probable production.

Answers
here
↓

1. Wheat planted for all purposes last fall and winter	Acres	.....
2. Wheat combined or threshed for grain	Acres	.....
	Bushels	.....
3. Wheat cut for hay	Acres	.....
	Tons	.....
4. Wheat used only for pasture, silage, or plowed under for soil improvement	Acres	.....
5. Wheat abandoned (not harvested, not pastured)	Acres	.....
6. Rye planted for all purposes last fall and winter	Acres	.....
7. Rye combined or threshed for grain	Acres	.....
	Bushels	.....
8. Rye cut for hay	Acres	.....
	Tons	.....
9. Rye used only for pasture, silage, or plowed under for soil improvement	Acres	.....
10. Rye abandoned (not harvested, not pastured)	Acres	.....
11. Oats planted for all purposes last fall and this spring	Acres	.....
12. Oats combined or threshed for grain	Acres	.....
	Bushels	.....
13. Oats cut for hay	Acres	.....
	Tons	.....
14. Oats used only for pasture, silage, or plowed under for soil improvement	Acres	.....
15. Oats abandoned (not harvested, not pastured)	Acres	.....
16. Barley planted for all purposes last fall and this spring	Acres	.....
17. Barley combined or threshed for grain	Acres	.....
	Bushels	.....
18. Barley cut for hay	Acres	.....
	Tons	.....
19. Barley used only for pasture, silage, or plowed under for soil improvement	Acres	.....
20. Barley abandoned (not harvested, not pastured)	Acres	.....
21. Mixed small grains planted for all purposes last fall and this spring	Acres	.....
	Name mixture /	.....
22. Mixed small grains combined or threshed for grain	Acres	.....
	Bushels	.....
23. Mixed small grains cut for hay	Acres	.....
	Tons	.....
24. Acres of all land in this farm or plantation (Include land rented from others)	Acres	.....

(Other side for comments and name)

18-70471-12

Exhibit 5

ACREAGE AND PRODUCTION OF CROPS - 1962		C. E. 2-9833 "D"	Ohio, Ind.																																																															
		Please Answer These Questions For The Farm You Operate	Answer here ↓																																																															
<p>U. S. Department of Agriculture Statistical Reporting Service</p> <p>3</p> <p>Dear Sir:</p> <p>About two months ago information was supplied by farmers on the acreage and production of small grains shortly after harvest.</p> <p>The information asked for on this form is needed in preparing final estimates of acreage and yield of late harvested crops in 1962, and in estimating winter wheat, barley and rye sowings this fall.</p> <p>Please fill out this form on both sides and return it promptly in the enclosed envelope which requires no stamp. Your report will be kept confidential.</p> <p style="text-align: right;">Respectfully,</p> <p style="text-align: right;"><i>G. D. Simpson</i></p> <p style="text-align: right;">G. D. Simpson Chairman, Crop Reporting Board</p> <p style="text-align: center;">SPECIAL INSTRUCTIONS</p> <p>Report for the land you are operating, including land rented from others. In reporting acres harvested and total production, include acres that still remain to be harvested and probable production.</p>	<p style="text-align: center;">FIELD CROPS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Corn planted for all purposes</td> <td style="width: 10%; text-align: center;">Acres</td> <td style="width: 10%;"></td> </tr> <tr> <td>Corn harvested and to be harvested for grain</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Bushels</td> <td></td> </tr> <tr> <td>Corn cut for silage</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Tons</td> <td></td> </tr> <tr> <td>Corn cut for fodder (ears not removed)</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Tons</td> <td></td> </tr> <tr> <td>Corn pastured and hogged down (without husking)</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td>Corn abandoned (will not be harvested or pastured)</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td>Soybeans planted for all purposes</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td>Soybeans harvested and to be harvested for beans</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Bushels</td> <td></td> </tr> <tr> <td>Soybeans cut for hay</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Tons</td> <td></td> </tr> <tr> <td>Soybeans used for silage, pasture only, plowed under, or abandoned</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td>Sorghums (grain & forage) planted for all purposes</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td>Sorghums harvested and to be harvested for grain</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Bushels</td> <td></td> </tr> <tr> <td>Sorghums cut for silage</td> <td style="text-align: center;">Acres</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Tons</td> <td></td> </tr> <tr> <td>Sorghums cut for forage and hay (not removed)</td> <td style="text-align: center;">Acres</td> <td></td> </tr> </table>			Corn planted for all purposes	Acres		Corn harvested and to be harvested for grain	Acres			Bushels		Corn cut for silage	Acres			Tons		Corn cut for fodder (ears not removed)	Acres			Tons		Corn pastured and hogged down (without husking)	Acres		Corn abandoned (will not be harvested or pastured)	Acres		Soybeans planted for all purposes	Acres		Soybeans harvested and to be harvested for beans	Acres			Bushels		Soybeans cut for hay	Acres			Tons		Soybeans used for silage, pasture only, plowed under, or abandoned	Acres		Sorghums (grain & forage) planted for all purposes	Acres		Sorghums harvested and to be harvested for grain	Acres			Bushels		Sorghums cut for silage	Acres			Tons		Sorghums cut for forage and hay (not removed)	Acres	
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Exhibit 6

C.E. 6-9
"A"UNITED STATES DEPARTMENT OF AGRICULTURE
Statistical Reporting ServiceBudget Bureau No. 40-R101.6
Approval expires December 31, 1962.

5

FALL 1962

TOBACCO INQUIRY

To Tobacco Growers:

This inquiry is being addressed to a number of tobacco growers to collect information as a basis for a reliable estimate of this year's tobacco crop. In order that the estimate may be as accurate as possible, it is necessary that we receive replies from a large number of individual growers. Will you, therefore, kindly furnish the following information and mail your report promptly in the enclosed envelope, which requires no stamp. Individual reports will be held confidential.

Respectfully,

G. D. Simpson

Chairman, Crop Reporting Board

REPORT FOR THE FARM YOU OPERATE

1. Total acres of all land in this farm acres
2. Acres of tobacco harvested on this farm last year acres
3. Acres of tobacco harvested on this farm this year acres
4. Total pounds of tobacco produced on this farm this year (estimate) pounds

REPORT FOR YOUR LOCALITY

5. In your opinion, what was the average yield per acre of tobacco in your locality this year? pounds per acre

Comments on this year's crop will be appreciated: _____

Reported by _____ Post office _____ Route _____

County (In which farm is located) _____ State _____ Date _____

Exhibit 7

(3) Budget Bureau No. 40-R306.7
Approval Expires 12/31/62

LOUISIANA CROP REPORTING SERVICE JUN 1962
U. S. Department of Agriculture Louisiana State University
Statistical Reporting Service Department of Agr'l Economics
Office of the Agricultural Statistician
P. O. Box 1126, Alexandria, Louisiana

June 1, 1962

RICE ACREAGE INQUIRY - JUNE 1962

Dear Sir:

The Department of Agriculture needs reports from a large number of growers in preparing dependable State estimates of rice acreage this year. We would appreciate your assisting us in preparing these estimates by supplying the information requested below. Please return this inquiry in the enclosed envelope which requires no stamp. Individual reports will be held confidential.

Very truly yours,

Clarence O. Parker

Clarence O. Parker
State Agricultural Statistician

REPORT FOR THE FARM(S) YOU OPERATE

1. Acres of RICE for harvest on this farm this year (1962);
(include any acreage not yet planted) acres
2. Acres of RICE harvested on this farm last year (1961)..... acres
3. Acres of ALL land in this farm this year (1962);
(include land rented from others) acres

Your comments on acreage still to be seeded, stands, weather, etc., will be appreciated.

NAME POST OFFICE
PARISH RURAL ROUTE NUMBER
(in which farm is located)

Exhibit 8

Excerpt From the Questionnaire Used for the June Enumerative Survey

(Oklahoma, Texas, New Mexico)

- 2 -

SECTION II. FIELDS AND

[illegible]

- 3 -

(Oklahoma, Texas, New Mexico)

CROPS IN SEGMENT

In Cols. (2) through (32) account for every acre listed in Col. (1).

[illegible]

Excerpt From the Questionnaire Used for the December Enumerative Survey

[illegible]

If NO (), Proceed to Section II on page 3.

- 2 -

If YES (), Complete Section II;
If NO (), Skip to Section III.

[illegible]

Exhibit 10

**PLEASE MAIL BY
JANUARY 1, 1963**

4



FARM REPORT

U. S. DEPARTMENT OF AGRICULTURE
Statistical Reporting Service

Please make necessary corrections in name and address.

Keep the Crop Reports Coming:

You can be proud of your part in the official crop reporting program. Your reports are combined with others from all over the country to provide information that will help you in planning and marketing your crops.

So--please answer this month's questions and remember to:

1. Read the instructions.
2. Mail your report promptly in the enclosed envelope which needs no stamp.

Happy New Year.

G. D. Simpson
G. D. Simpson

Chairman, Crop Reporting Board

P.S. Individual reports are kept confidential.

"Farm With Facts"

C.E. 2-110

Ohio, Ind., Ill., Minn., Iowa, Mo.,
N. Dak., S. Dak., Nebr., Kans., W. Va.

Please Answer These Questions
For The Farm or Ranch You Operate

Answer
here
↓

CROP PRODUCTION AND STOCKS

CORN produced on this farm or ranch
last year (1962 crop) –
70 lb. ear or 56 lb. shelled **BUSHELS**

CORN on this farm or ranch Jan. 1, 1963 –
70 lb. ear or 56 lb. shelled **BUSHELS**

ALL WHEAT (including durum) produced
on this farm or ranch
last year (1962 crop) – 60 pound **BUSHELS**

ALL WHEAT (including durum) on this
farm or ranch Jan. 1, 1963 – 60 pound **BUSHELS**

DURUM WHEAT on this farm or ranch
Jan. 1, 1963 – 60 pound **BUSHELS**

OATS produced on this farm or ranch
last year (1962 crop) – 32 pound **BUSHELS**

OATS on this farm or ranch Jan. 1, 1963 –
32 pound **BUSHELS**

BARLEY produced on this farm or ranch
last year (1962 crop) – 48 pound **BUSHELS**

BARLEY on this farm or ranch
Jan. 1, 1963 – 48 pound **BUSHELS**

RYE produced on this farm or ranch
last year (1962 crop) – 56 pound **BUSHELS**

RYE on this farm or ranch
Jan. 1, 1963 – 56 pound **BUSHELS**

SORGHUM GRAIN produced on this farm or
ranch last year (1962 crop) – 56 pound **BUSHELS**

SORGHUM GRAIN on this farm or ranch
Jan. 1, 1963 – 56 pound **BUSHELS**

SOYBEANS produced on this farm or ranch
last year (1962 crop) – 60 pound **BUSHELS**

SOYBEANS on this farm or ranch
Jan. 1, 1963 – 60 pound **BUSHELS**

FLAXSEED produced on this farm or ranch
last year (1962 crop) – 56 pound **BUSHELS**

FLAXSEED on this farm or ranch
Jan. 1, 1963 – 56 pound **BUSHELS**

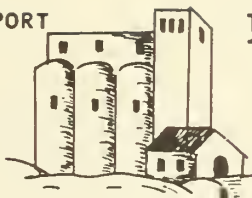
ALL HAY harvested on this farm or ranch
last year (1962 crop) – **TONS**

ALL HAY on this farm or ranch Jan. 1, 1963 – **TONS**

Exhibit 11

JANUARY 1 GRAIN STOCKS REPORT

U. S. Department of Agriculture
Statistical Reporting Service
Washington, D. C.



1

To Managers of Mills, Elevators,
Warehouses, and Other Storages:

Please fill out and return this report as **EARLY IN JANUARY** as possible. If your firm operates plants in more than one State, separate reports should be prepared for each State. **YOUR INDIVIDUAL REPORT WILL BE KEPT CONFIDENTIAL.**

The enclosed envelope requires no stamp.

Respectfully,

Chairman, Crop Reporting Board

COMMENTS: _____

12 Budget Bureau No. 40-R014.9
Approval expires Oct. 31, 1963

C.E. 2-9874

January 1, 1963

SPECIAL INSTRUCTIONS

If you operate more than one mill, elevator, or warehouse, in a State, report the data for individual plants on the reverse side.

If no stocks are on hand, please enter "None" and return report.

Government (CCC) owned grain stored at this plant should be included as well as all other grain stored here.

STORAGE CAPACITY		Answer here ↓
Rated BULK storage capacity	BUSHELS	
Has there been any change in bulk storage capacity since January 1, 1962 Yes <input type="checkbox"/> No <input type="checkbox"/>		
If yes:		
How much has been added	BUSHELS	
How much has been discontinued	BUSHELS	
Rated SACKED storage capacity (Other than bulk capacity reported above)	BUSHELS	
STOCKS AT THIS PLANT JANUARY 1, 1963 (Report total stocks including grain you own and grain stored for farmers, millers, processors, and the Government-Commodity Credit Corporation)		
WHEAT (including durum)	BUSHELS	
RYE	BUSHELS	
SOYBEANS	BUSHELS	
FLAXSEED	BUSHELS	
CORN, shelled and on ear	BUSHELS	
OATS	BUSHELS	
BARLEY (grain only, exclude malt)	BUSHELS	
SORGHUM GRAIN	POUNDS	

(Signature of person furnishing information)

Over, please

Exhibit 12

**SWEET CORN
FRESH MARKET - 1962**

SPECIAL INSTRUCTIONS—Please report the condition as compared with the normal growth and vitality you would expect at this time, if there had been no damage from unfavorable weather, insects, disease, etc. Let 100 percent represent a normal condition. If crop has already been harvested, give condition at time of harvest.

	ANSWERS HERE
JULY 1	↓
REPORT FOR YOUR FARM:	
Acres of sweet corn harvested last year, 1961 .....acres	
Acres for harvest this year, 1962 .....acres	
REPORT FOR YOUR LOCALITY:	
Acres for harvest this year compared with acres harvested last year (Let 1961 = 100%) .....percent	
Condition of sweet corn .....percent	
Probable yield per acre .....per 60 ears.....or bu.	
AUGUST 1	
REPORT FOR YOUR LOCALITY:	
Condition of sweet corn .....percent	
Probable yield per acre .....per 60 ears.....or bu.	
Avg. price received July 16-31 .....per 60 ears.....or bu. \$	
SEPTEMBER 1	
REPORT FOR YOUR LOCALITY:	
Condition of sweet corn .....percent	
Yield per acre .....per 60 ears.....or bu.	
Avg. price received Aug. 16-31 .....per 60 ears.....or bu. \$	

Exhibit 13

JUN 1963

Budget Bureau No. 40-R301.8
Approval Expires 3/31/66

OHIO CROP REPORTING SERVICE
 United States Department of Agriculture Ohio Agricultural Experiment Station
 Statistical Reporting Service Dept. of Agricultural Economics
 217 Old Federal Building, Columbus, Ohio

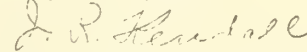
May 24, 1963

COMMERCIAL VEGETABLE INQUIRY - JUNE 1, 1963

Dear Sir:

Your knowledge of the vegetable crop conditions in your locality can be of real assistance in the preparation of the June 1 Commercial Vegetable Report. A reply will be appreciated even though you can answer for only one or two of the items. The enclosed envelope which requires no stamp is for mailing your reply.

Very truly yours,



J. R. Kendall

Agricultural Statistician, In Charge

CONDITION: -- Please report the condition of crops now, as compared with the normal growth and vitality you would expect at this time, if there had been no damage from unfavorable weather, insects, disease, etc. Let 100 percent represent a normal condition.

YIELD: -- Report the probable yield per acre which you estimate will be produced in your locality this year.

PRICE: -- Give the average price received by growers for all grades sold from May 16-31, 1963.

REPORT FOR YOUR LOCALITY

CROP	:ACREAGE FOR HARVEST :	: THIS YEAR COMPARED :	: PROBABLE :	: YIELD :	: UNIT :	: AVERAGE PRICE :
	: WITH ACREAGE HAR- :	: VESTED LAST YEAR :	: CONDITION: PER ACRE :	: (Specify weight :	: PER UNIT:	: RECEIVED:
	: (Let last year's :	: THIS YEAR:	: of contents :	: MAY 16-31:		
	: acreage=100 percent): :					
	: Percent :	: Percent :				
ASPARAGUS	: XXXXX :			: basket of _____ lb.:		
EARLY CABBAGE	: XXXXX :			: basket of _____ lb.:		
CARROTS	: : XXXXXX :	: XXXXXX :	: XXXXXXXXXXXX :	: XXXXXX :		
EARLY CELERY				: basket of _____ lb.:	: XXXXXX :	
ENDIVE (INCLUDE:						
ESCAROLE	: : XXXXXX :	: XXXXXX :	: XXXXXXXXXXXX :	: XXXXXX :		
LETTUCE				: 10 lb. basket :		
SPINACH	: XXXXX :			: basket of _____ lb.:		
STRAWBERRIES	: XXXXXX :			: crate of _____ qts.:		
EARLY TOMATOES:				: basket of _____ lb.:	: XXXXXX :	

When will picking of strawberries be heaviest in your locality
 this season?

For Southern Ohio only:

About when will the marketing of tomatoes begin in your locality?

When will the marketing of cabbage reach its peak in your locality?

Exhibit 14

Budget Bureau #40-R301.8

Approval Expires 3/31/66

COLORADO CROP AND LIVESTOCK REPORTING SERVICE

U. S. Dept. of Agriculture
STATISTICAL REPORTING SERVICE

Cooperating

State of Colorado
DEPARTMENT OF AGRICULTURE

Office of the Agricultural Statistician, 330 Custom House, Denver 2, Colo.

May 16, 1963

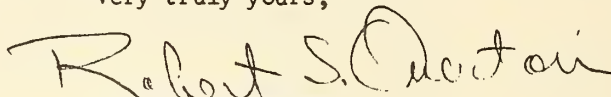
DRY ONION ACREAGE INQUIRY - 1963

Dear Sir:

In order that you may have dependable information regarding the 1963 crop of onions, the Dept. of Agriculture is making this survey to determine the acreage planted and to be planted in the principal producing States. Please answer the questions below and return this inquiry

promptly. Your report will be held as confidential. A copy of the completed report, giving the acreage for Colorado and other States, will be sent to you. Thank you for a complete and prompt report.

Very truly yours,



ROBERT S. OVERTON

Statistician in Charge

Is

REPORT FOR THE FARM YOU OPERATE

1. Acres of dry ONIONS planted this year (1963). Acres
2. Acres of dry ONIONS planted last year (1962). Acres
3. Acres of dry ONIONS harvested last year (1962). Acres

REPORT FOR YOUR LOCALITY

4. How does the 1963 acreage of dry onions in your locality compare with the acreage planted last year (1962)?
(Let last year's acreage equal 100 percent) Percent

COMMENTS regarding condition of the crop, stands, water supply, prices and other factors which may have influenced the acreage this year:

NAME

RT.

POST OFFICE

COUNTY

Exhibit 15

FEB 1962

BUDGET BUREAU No. 40-R301.7
APPROVAL EXPIRES 3/31/63

A - C - D
FEDERAL-STATE CROP REPORTING SERVICE
Statistical Reporting Service
Raleigh North Carolina

COMMERCIAL VEGETABLE INQUIRY

REPORT FOR THE FARM(S) YOU OPERATE

EARLY FALL SNAP BEANS

Acres of Early Fall Snap Beans

Harvested on this farm in 1960... Acres _____

Acres Planted in 1961... Acres _____

Acres Harvested in 1961... Acres _____

Total Production Harvested
in 1961... Bushels _____

LATE FALL CABBAGE

Acres of Late Fall Cabbage

Harvested in 1960... Acres _____

Acres you Planted in 1961... Acres _____

Acres you Harvested in 1961... Acres _____

Total Production Harvested
in 1961... Tons _____

REPORT FOR YOUR LOCALITY

In your opinion, how did the acreage of the following crops harvested in your locality in 1961 compare with acreage harvested in 1960? (Let 1960 equal 100 percent):

SNAP BEANS (Early Fall)... Percent _____

CABBAGE (Late Fall)... Percent _____

In your opinion what percentage of the production of these crops was not harvested due to low price or other economic factors.

SNAP BEANS (Early Fall)... Percent _____

CABBAGE (Late Fall)... Percent _____

YIELD PER ACRE IN YOUR LOCALITY IN 1961

SNAP BEANS (Early Fall)... Bushels _____

CABBAGE (Late Fall)... Tons _____

AVERAGE PRICE RECEIVED BY GROWERS
IN YOUR LOCALITY IN 1961

SNAP BEANS (Early Fall)... Bushel \$ _____

CABBAGE (Late Fall)... Ton \$ _____

Dear Crop Reporter

Final estimates of the 1961 acreage and production for the crops listed are now being prepared. We urge each grower to assist in preparing these estimates by answering the questions for each crop grown in his local shipping area.

Please remember to

1. Note the special instructions.
2. Mail your report in the enclosed envelope which requires no stamp.

Sincerely yours,

Henry L. Rasor

HENRY L. RASOR
Agricultural Statistician

SPECIAL INSTRUCTIONS

UNIT OF MEASURE: If the unit you use for reporting production, yield, or price differs from the one listed, please indicate the size and type used for your report.

PRICES RECEIVED: Give average prices received by growers for all grades and methods of sale -- at the farm, F.O.B. local shipping point, auction etc during the 1961 season in your locality

COMMENTS _____

Exhibit 16

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICE
WASHINGTON 25, D. C.

187

Budget Bureau No. 40-RO70.6
Approval Expires 12-31-62

June 15, 1962

GREEN LIMA BEANS FOR PROCESSING
(Fordhooks and Baby Limas)

PRELIMINARY ACREAGE FOR 1962

Dear Sir:

In order to provide processors and others with information on the 1962 acreage of green lima beans for processing, we need your report on the following items. A report will be released on July 10 showing, by States, total acreage of lima beans for processing, and for the United States, separate figures for canning and freezing. All information relating to individual firms will be treated as confidential. The enclosed envelope, which requires no stamp, should be used for your reply. Your cooperation will be greatly appreciated.

Very truly yours,



G. D. Simpson, Chairman
Crop Reporting Board

The duplicate copy of this form
is for your files.

STATES WHERE GROWN	ACREAGE OF GREEN LIMA BEANS FOR PROCESSING			
	Report total acreage, including acreage grown by your firm as well as that grown under contract to your firm			
	FOR CANNING, SOUPS AND OTHER HEAT-PROCESSED PRODUCTS		FOR FREEZING	
	PLANTED IN 1961	PLANTED AND TO BE PLANTED IN 1962	PLANTED IN 1961	PLANTED AND TO BE PLANTED IN 1962
Please report separately for each State.				
FORDHOOK TYPE:	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
BABY LIMA TYPE:				

LIMA BEANS - Preliminary Acreage

REPORT PREPARED BY _____

DATE _____

CEV 1501

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICE
WASHINGTON 25, D. C.

Budget Bureau No. 40-RO70.6
Approval Expires 12-31-62

August 24, 1962

VEGETABLES FOR PROCESSING

CONDITION AND PROBABLE YIELD ON SEPTEMBER 1, 1962

Dear Sir:

For each of the crops listed below, please give the condition of the growing crop on September 1. This information is needed for the indicated production report which will be released on September 11. Please designate the States and plants to which your report pertains for each crop. Please report the condition of crops now, as compared with the normal growth and vitality you would expect at this time if there had been no damage from unfavorable weather, insects, pests, etc. If condition is asked for any crop that has already been harvested, give condition at time of harvest. Let 100 percent represent a normal condition. For probable yield your report should take into account both the yield on acreage harvested and the expected yield on acreage remaining for harvest.

The enclosed envelope, which requires no stamp, should be used for your reply.

Very truly yours,

G. D. Simpson

G. D. Simpson
Chairman, Crop Reporting Board

STATE WHERE GROWN	CONDITION AND PROBABLE YIELD													
	GREEN LIMA BEANS		SNAP BEANS		BEETS FOR CANNING		CABBAGE		SWEET CORN		CUCUMBERS FOR PICKLES		TOMATOES	
	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre	Condition	Probable Yield Per Acre
Please report separately for each State.														

FIRM NAME

REPORT PREPARED BY

POST OFFICE

DATE

COUNTY

STATE

(Your comments may be placed on the back of this sheet.)

CEV - 1507

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICE
WASHINGTON 25, D. C.

12 Budget Bureau No. 40-RU7C.
Approval Expires 12/31/62

September 10, 1962

GREEN PEAS FOR PROCESSING
ACREAGE, PRODUCTION AND PRICE TO GROWERS IN 1962

In order to provide processors and others with information on the 1962 production of green peas for processing, we need your report on the following items. Please note that separate information is desired on green peas for canning and green peas for freezing.

If harvesting has not been completed please estimate the acreage that will be harvested and the total tonnage that will be received. Please include all tonnage bought from growers even though some was sold to other processors. Do not include tonnage bought from other processors.

A summary will be released on December 18, showing, by States, total acreage, production and price of green peas for processing, and, for the United States, separate figures for canning and freezing.

All information relating to individual firms will be treated as confidential. The enclosed envelope, which requires no stamp, should be used for your reply. Your cooperation will be greatly appreciated.

G. D. Simpson

G. D. Simpson, Chairman
Crop Reporting Board

The duplicate is for your files.

If your firm did not process green peas in 1962, please write "NONE" across the face of this questionnaire, sign and return it.

STATES WHERE GROWN Please report separately for each State.	CONTRACTED OR GROWN BY YOUR FIRM IN 1962			OPEN-MARKET PURCHASES IN 1962 Pay-weight received	AVERAGE PRICE PAID IN 1962 At vining station on a pay- weight basis.	
	Acres planted	Acres harvested	TONNAGE pay-weight received		For Contract Tonnage	For Open- Market Tonnage
	<u>Acres</u>	<u>Acres</u>	<u>Tons (Shelled)</u>	<u>Tons (Shelled)</u>	<u>Per ton (Shelled) Dollars</u>	<u>Per ton (Shelled) Dollars</u>
GREEN PEAS FOR CANNING (Including soups):						
GREEN PEAS FOR FREEZING:						

Report prepared by

Date _____

State _____

Exhibit 19

LIVESTOCK REPORT

DISPOSITION OF LIVESTOCK DURING 1962

C.F. 11-57	Please Answer These Questions For The Farm You Operate	Answer here ↓
CATTLE AND CALVES		
ALL CATTLE AND CALVES on this farm now (Jan. 1, 1963) - NUMBER		
COWS AND HEIFERS 2 years old and older on this farm now - NUMBER		
CALVES BORN ALIVE on this farm in 1962 (Include calves on hand and calves sold or died. Do not include calves bought.) - NUMBER		
1962 CALVES DIED (Include calves lost from disease, accident, destroyed at birth etc.) on this farm in 1962 - NUMBER		
CATTLE DIED on this farm in 1962 - NUMBER		
CALVES SLAUGHTERED BY OR FOR YOU during: (Do not include calves sold alive)		
January, February and March 1962 - NUMBER		
April, May and June 1962 - NUMBER		
July, August and September 1962 - NUMBER		
October, November & December 1962 - NUMBER		
TOTAL LIVEWEIGHT of CALVES slaughtered in 1962 - POUNDS		
CATTLE SLAUGHTERED (exclude calves) BY OR FOR YOU during: (Do not include cattle sold alive)		
January, February and March 1962 - NUMBER		
April, May and June 1962 - NUMBER		
July, August and September 1962 - NUMBER		
October, November & December 1962 - NUMBER		
TOTAL LIVEWEIGHT of CATTLE slaughtered in 1962 - POUNDS		
HOGS		
ALL HOGS (including pigs) on this farm now (Jan. 1, 1963) - NUMBER		
SOWS AND GILTS, farrowed and to be farrow Dec. 1, '62 - June 1, '63 - NUMBER		
SPRING PIGS BORN on this farm in 1962 (all pigs born before June 1) - NUMBER		
FALL PIGS BORN on this farm in 1962 (all pigs born June 1 to Dec. 1, '62) - NUMBER		
HOGS AND PIGS DIED on this farm in 1962 - NUMBER		
HOGS AND PIGS SLAUGHTERED BY OR FOR YOU during: (Do not include hogs and pigs sold alive)		
January, February and March 1962 - NUMBER		
April, May and June 1962 - NUMBER		
July, August and September 1962 - NUMBER		
October, November & December 1962 - NUMBER		
TOTAL LIVEWEIGHT of HOGS and PIGS slaughtered in 1962 - POUNDS		
LARD rendered from all hogs and pigs slaughtered by or for you in 1962 (If none rendered, write "none") - POUNDS		

Over, please

7 1964	Please Answer These Questions For The Farm You Operate	Answer here ↓
SHEEP and LAMBS		
ALL SHEEP AND LAMBS on this farm now (Jan. 1, 1963) - NUMBER		
EWES AND EWE LAMBS KEPT FOR BREEDING EWES on this farm now - NUMBER		
LAMBS BORN on this farm in 1962 - NUMBER		
1961 LAMBS DIED on this farm in 1962 - NUMBER		
SHEEP DIED on this farm in 1962 - NUMBER		
LAMBS SLAUGHTERED BY OR FOR YOU during: (Do not include lambs sold alive)		
January, February and March 1962 - NUMBER		
April, May and June 1962 - NUMBER		
July, August and September 1962 - NUMBER		
October, November & December 1962 - NUMBER		
TOTAL LIVEWEIGHT of LAMBS slaughtered in 1962 - POUNDS		
SHEEP SLAUGHTERED BY OR FOR YOU during: (Do not include sheep sold alive)		
January, February and March 1962 - NUMBER		
April, May and June 1962 - NUMBER		
July, August and September 1962 - NUMBER		
October, November & December 1962 - NUMBER		
TOTAL LIVEWEIGHT of SHEEP slaughtered in 1962 - POUNDS		
ALL LAND IN THIS FARM now (include cropland, pasture, woodland, waste land, idle or fallow land, whether owned or rented from others) - ACRES		

Over, please

Exhibit 20

LIVESTOCK SURVEY, DEC. 1, 1962

C. E. 11-35 LIVESTOCK SURVEY, DEC. 1, 1962 N. S.

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICEPOSTAGE AND FEES PAID
U. S. DEPT. OF AGRICULTURE44 Budget Bureau No. 40-R1347.
Approval expires Dec. 31, 1963.

Name _____

Post office _____ R. _____
(Box)

County _____ State _____

	Acres	Number
1. Acres of ALL LAND in This Farm or Ranch (Include land rented from others)		
CATTLE AND CALVES (Report number on this farm or ranch now)		
2. COWS and HEIFERS, two years old and over, kept for milk. (Include all milk cows whether now in milk or dry and all 2-year-old heifers which will be milked when fresh)		
3. HEIFERS, one year old and under two, now being raised for milk cows		
4. COWS and HEIFERS, two years old and over, not kept for milk. (Include heifer cows and 2-year-old heifer heifers. Do not include any cows and heifers reported under Question 2)		
5. HEIFERS, one year old and under two, now being raised for heifer cows or for heifer. (Do not include any heifers being raised for milk cows reported under Question 3)		
6. STEERS, one year old and over		
7. BULLS, one year old and over		
8. 1962 HEIFER CALVES on this farm or ranch NOW. (Do not include any animals reported under Question 3 or 5)		
9. 1962 BULL CALVES and STEER CALVES on this farm or ranch NOW		
10. TOTAL CATTLE AND CALVES OF ALL AGES ON THIS FARM OR RANCH NOW. (Sum of items 2 to 9, inclusive)		
11. CATTLE ON FEED. How many of the above cattle and calves are NOW on grain feed for market?		
12. COWS MILKED on this farm or ranch yesterday		
13. ALL MILK COWS on this farm or ranch yesterday (both dry and in milk). (Do not include heifers not yet freshened)		
14. Total production of MILK on this farm or ranch yesterday. (Report only one day's production)	Pounds or Gallons	
15. CALVES BORN in 1962. (Include calves on hand, calves sold or died, and calves to be born in December. Do not include calves bought.)		
CHICKENS (Report number on this farm or ranch now)		
16. PULLETS BEING KEPT FOR LAYERS (Include laying pullets and pullets not of laying age)		
17. HENS, one year old and over		
18. OTHER CHICKENS		
19. Total CHICKENS (sum of items 16, 17, and 18)		
20. Number of HENS and PULLETS OF LAYING AGE in your flock yesterday		
21. Number of EGGS produced by your flock yesterday		

(See other side for report on Hogs and Sheep)

16-53335-16

HOGS AND PIGS

(Report number on this farm or ranch now)

22. HOGS over six months old (Include breeding stock)

23. PIGS under six months old

24. TOTAL HOGS and PIGS of all ages (sum of items 22 and 23)

FARROWINGS

25. Number of SOWS and GILTS that farrowed (gave birth to pigs) on this farm or ranch during the last six months (June 1 to December 1, 1962)

26. Number of PIGS SAVED from all litters farrowed on this farm or ranch during the last six months (June 1 to December 1, 1962)

27. Of the SOWS and GILTS that farrowed during the last six months (Question 25), how many farrowed in each of the following months?

June

July

Aug.

Sept.

Oct.

Nov.

28. Number of SOWS and GILTS that have been bred or will be bred to farrow on this farm or ranch between December 1, 1962, and June 1, 1963

BREEDING AND STOCK SHEEP

(Report number on this farm or ranch now. Do not include sheep and lambs being fattened for market)

29. EWES one year old and over

30. EWE LAMBS under one year

31. WETHER and RAM LAMBS under one year

32. WETHERS and RAMS one year old and over

SHEEP AND LAMBS BEING FATTENED FOR MARKET
(Do not include any reported under Questions 29 to 32)

33. SHEEP, including yearlings being fattened for market

34. LAMBS under one year being fattened for market

35. TOTAL SHEEP and LAMBS of all ages on this farm or ranch NOW (sum of items 29 to 34, inclusive)

WOOL

36. SHEEP SHORN on this farm or ranch during the year

37. Total pounds of WOOL shorn from SHEEP

38. LAMBS SHORN on this farm or ranch during the year

39. Total pounds of WOOL shorn from LAMBS

(See other side for report on Cattle and Poultry)

N. S.

16-53335-16 U. S. GOVERNMENT PRINTING OFFICE

Exhibit 21

WESTERN SHEEP INQUIRY
JANUARY 1, 1963

C.E. 11-24

WEST

Please report your own sheep and lambs, also any others in which you have an interest. If exact numbers are not known, give your best estimate.		Answer here ↓
STOCK SHEEP AND LAMBS ON THIS FARM, RANCH, RANGE OR OUTFIT about January 1, 1963 (Do not include sheep and lambs being fattened for market.)		
1.	NEW CROP LAMBS born after October 1, 1962 on hand NOW (January 1, 1963) - NUMBER	
2.	STOCK SHEEP AND LAMBS on hand NOW (January 1, 1963): a. BUCK and WETHER LAMBS over three months old and under one year - NUMBER b. EWES LAMBS over three months old and under one year old - NUMBER c. BUCKS and WETHERS one year old and over - NUMBER d. EWES one year old and over (Include coming two's and older ewes) - NUMBER e. TOTAL STOCK SHEEP and LAMBS over 3 months old on hand NOW (Sum of items 2a, 2b, 2c, 2d. Do not include new crop lambs) - NUMBER	
3.	TOTAL STOCK SHEEP and LAMBS over three months old on hand a YEAR AGO, January 1, 1962 (Do not include lambs that were born between October 1, 1961 and January 1, 1962) - NUMBER	
SHEEP AND LAMBS ON FEED (Do not include stock sheep and lambs reported above)		
4.	LAMBS and SHEEP on feed NOW (January 1, 1963) for market a. Lambs - NUMBER b. Sheep - NUMBER	
5.	LAMBS and SHEEP on feed a YEAR AGO (January 1, 1962) for market - NUMBER	
BIRTHS, DEATHS AND FARM SLAUGHTER in 1962		
6.	LAMBS marked, docked or branded in 1962 - NUMBER	
7.	LAMBS lost or died after docking and before the end of the year - NUMBER	
8.	SHEEP lost or died from all causes during 1962 - NUMBER	
9.	SHEEP and LAMBS butchered by or for you in 1962 - NUMBER	

Over, please

Please report your own sheep and lambs also any others in which you have an interest. If exact numbers are not known, give your best estimate.

Answer here



WOOL PRODUCTION

10.	STOCK SHEEP a. Stock sheep shorn in 1962 (Include yearling ewes and bucks held for breeding.) - NUMBER b. Wool shorn from these sheep in 1962 (Including tags) - POUNDS	
11.	FED LAMBS and SHEEP a. Feeder lambs and fed sheep and lambs shorn in 1962 (Do not include yearling ewes held for breeding) - NUMBER b. Wool shorn from these lambs and sheep in 1962 (including tags) - POUNDS	
Please Answer These Questions For Your Locality		
SHEEP AND LAMB VALUES Report average value per head in your locality on January 1, 1963		
12.	EWES one year old and over (include coming two's and older ewes) - per head	\$
13.	EWES LAMBS , coming yearlings - per head	\$
14.	WETHER LAMBS - per head	\$
15.	BUCKS of all ages - per head	\$

Over, please

Exhibit 22

CATTLE DECEMBER 19—RURAL CARRIER SUMMARY SHEET

U. S. Department of Agriculture
Statistical Reporting Service
Crop Reporting Board

C. E. F. 31 (REV. 11/60)

STATE

ALL REPORTS

D 1 s t.	Farms listed		Milk		Beef		Stags & Bulls 1+		Calves		Cattle on feed		Calves born		Milk cows 2+		Ratio per All Cattle	
	No. of farms	Rept'g. No. of Cattle	Cows 2+ Number	% of State	Heifers 1-2 yrs. No.	Cows 2+ Number	Heifers 1-2 yrs. Number	Stags 1+ Number	Bulls 1+ Number	Heifer Number	% of State	Farms Rept'g. Number	Total Number	% of State	Cows 2+ Number	% of State	This year	Last year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
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21																		
22																		
23																		
24																		
25																		

IDENTICAL REPORTS DEC.-DEC. 1/

D 1 s t.	Farms listed		Milk		Beef		Stags 1+		Bulls 1+		Calves		All cattle	
	No. of farms	Rept'g. No. of Cattle	Cows 2+ Number	% of State	Heifers 1-2 yrs. No.	Cows 2+ Number	Heifers 1-2 yrs. Number	Stags 1+ Number	Bulls 1+ Number	Heifer Number	% of State	Farms Rept'g. Number	Total Number	% of State
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2														
3														
4														
5														
6														
7														
8														
9														
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11														
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22														
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24														
25														

IDENTICALS DEC.-DEC. 1/

D 1 s t.	Farms listed		Milk		Beef		Stags 1+		Bulls 1+		Calves		All cattle	
	No. of farms	Rept'g. No. of Cattle	Cows 2+ Number	% of State	Heifers 1-2 yrs. No.	Cows 2+ Number	Heifers 1-2 yrs. Number	Stags 1+ Number	Bulls 1+ Number	Heifer Number	% of State	Farms Rept'g. Number	Total Number	% of State
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2														
3														
4														
5														
6														
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24														
25														

1/ Identicals all cattle, milk cows 2+ and beef cows 2+ required; other classes optional.

STATE

C E F 31

Exhibit 23

CATTLE ON FARMS WORK SHEET

CEF 59 (Rev. 10/63)
USDA - SRS

State _____

Item		Indication		Chart readings						
		St.	Wtd.	Statist		Board				
				% of prev. year	No. (000)	% of prev. year	No. (000)			
ALL CATTLE										
FMS	Direct expansion									
	Ratio per _____ farm (_____) x no. (_____) farms									
	Ratio per cattle farm (_____) x no. (_____) cattle farms									
	Identical C/C % previous year									
Dec. R.C.	Ratio per livestock farm (_____) x no. (_____) livestock farms									
	Ratio per cattle farm (_____) x no. (_____) cattle farms									
	Identical C/C % (Ident. C/H % Western States _____)									
	All reports C/H _____ % adj. by _____ points bias (Western States)									
Dec. Enum.	Direct expansion _____ Coef. of variation _____ %									
	December/June ratio expansion _____ Coef. of variation _____ %									
Balance sheet indicated percent previous year										
Check	No. assessed _____ (000)	Assessed plus	% of prev. year							
data	Cattle marketed Jan. 1 to asgm's date _____ (000)	marketings	No. (000)							
COWS AND OTHER CATTLE										
Cows 2+ for milk	FMS	Ratio per _____ farms (_____) x no. (_____) farms								
		Identical C/C %								
	Dec. R.C.	Ratio per livestock farm (_____) x no. (_____) livestock farms								
		Identical C/C %								
Other cows 2+	FMS	Identical C/C %								
	Dec. R.C.	Identical C/C %								
All cows & heifers 2+	FMS	Direct expansion _____ Coef. of variation _____ %								
		Dec./June ratio exp. _____ Coef. of variation _____ %								
	Dec. Enum. Survey									
SEC or assessment of milk cows _____ percent prev. year _____ % No. _____										
SEC or assessment of beef cows _____ percent prev. year _____ % No. _____										
ASSESSMENTS				PERCENT OF TOTAL CATTLE						
Assessment date _____	% of total	No. (000)	Classes	Prob. sample	Dec. R.C.	Preliminary Statist Board	Revised Statist Board			
			Cows 2 yrs.+							
			Milk							
			Other							
			Heifers 1 - 2							
			Milk							
			Other							
			Calves							
			Heifers							
			Other							
			Steers 1+							
			Bulls 1+							
ESTIMATES OF CATTLE AND CALVES ON FARMS JANUARY 1										
Classes	Last year			This year						
	Current Board	Revised		Preliminary				Revised		
		Statist Board	Board	Statist Board	Board	Statist Board	Board			
	No. (000)	No. (000)	No. (000)	% of prev. yr. (000)	No. (000)	% of prev. yr. (000)	No. (000)	% of prev. yr. (000)	No. (000)	% of prev. yr. (000)
All cattle										
Cows 2 yrs.+	For milk									
	Other									
Heifers 1 - 2	For milk									
	Other									
Calves	Heifers for milk									
	Other									
Steers 1 year+										
Bulls 1 year+										
CATTLE ON FARMS WORK SHEET										
JANUARY 1, _____ State _____										

C.E.F. 59

Exhibit 24

CATTLE AND CALVES
DISPOSITION AND BALANCE SHEETC.E.F.-119
(Revised 10/55)U. S. Department of Agriculture
Crop Reporting Board

YEAR _____

STATE _____

FARM SLAUGHTER AND DEATHS												
Indications Of Farm Slaughter And Deaths (from Jan. 1 Disposition or Western R.C.)										Indi- cations	Chart Readings Number (000)	
											Statist	Board
FARM SLAUGHTER	Cattle slaughter per cattle farm	(1)										
	Calf slaughter per cattle farm	(2)										
	Cattle and calf slaughter per cattle farm	(3)										
	Calf slaughter as % of total cattle and calf slaughter (2 ÷ 3)	(4)										
	Calf slaughter (4 x 3)	(5)	xxx									
	Cattle slaughter (3 - 5)	(6)	xxx									
		(7)										
DEATHS	Ratio cattle deaths to No. on hand end of yr. (Ratio _____ x No. _____)	(8)										
		(9)										
	Ratio calf deaths to calves born (Ratio _____ x calves _____)	(10)										
		(11)										

NUMBER AND WEIGHT OF CATTLE AND CALVES ON HAND ^{1/}					INSHIPMENTS (000)			
Class	First of Year		End of Year		A.Q.B. 2/	Feeding Br. & Dairy	State Insp.	Feeding Br. & Dairy
	Head (000)	% wt. (lbs.)	Head (000)	Av. wt. (lbs.)				
Milk cows 2 yrs. +								
Milk heifers 1-2 yrs.								
Heifer calves								
Other cows 2 yrs. +								
Beef heifers 1-2 yrs.								
Other calves								
Steers 1 yr. +								
Bulls 1 yr. +								
Total Head & Av. Wt.								
Total Weight								
Difference	+		-					

MARKETINGS (000)									
Market Record									

SLAUGHTER (000)									
Federal Inspected									
Wholesale									
Local									
Butcher									
Total									
Total ^{2/}									

CATTLE AND CALF BALANCE SHEET												
Debits (000) head	Statist						Board					
	Preliminary			Revised			Preliminary			Revised		
	Cows 2+	% Cows 2+	Cattle & Calves	Cows 2+	% Cows 2+	Cattle & Calves	Cows 2+	% Cows 2+	Cattle & Calves	Cows 2+	% Cows 2+	Cattle & Calves
On hand First of Yr. (12)		xxx			xx			xx			xx	
Calf Crop (13)	xx			xx			xx			xx		
Inshipments (14)	xx	xx		xx	xx		xx	xx		xx	xx	
Total (12 + 13 + 14) (15)	xx	xx		xx	xx		xx	xx		xx	xx	

Credits (000) head												
Cattle	Calves	Cattle & Calves	Cattle	Calves	Cattle & Calves	Cattle	Calves	Cattle & Calves	Cattle	Calves	Cattle & Calves	
Recorded Marketings (16)												
Other Marketings (17)												
Local Slaughter (18)												
Farm Slaughter (19)												
Deaths (20)												
Total (16+17+18+19+20) (21)												
Ind. on hand end of yr. (15-21) (22)												
Percent change (22:12) (23)	xx	xx		xx	xx							
Total Credits (24)	xx	xx	xx	xx	xx	xx						

CATTLE AND CALVES DISPOSITION AND BALANCE SHEET												
										YEAR _____		
										STATE _____		

Exhibit 25

QUARTERLY LIVESTOCK INQUIRY
OCTOBER 1, 1963

C.E. 11-29		October 1, 1963
Report For Your Own Operations		Answer here ↓
1.	Acres of all land in this form ACRES	
2.	Acres of CORN on this farm October 1 ACRES	
HOGS		
3.	ALL HOGS and PIGS on this farm October 1, 1963 NUMBER	
4.	SOWS FARROWED since June 1 NUMBER	
5.	PIGS SAVED from these litters NUMBER	
6.	SOWS still to FARROW before December 1 NUMBER	
CATTLE		
7.	ALL CATTLE and CALVES on this farm October 1, 1963 NUMBER	
8.	CATTLE and CALVES BEING FATTENED on grain or concentrated feed Oct. 1 for SLAUGHTER MARKET NUMBER	
9.	How many of the CATTLE and CALVES BEING FATTENED October 1, have been on feed: a. Less than 3 months (placed on feed after July 1, 1963) NUMBER b. 3 to 6 months (placed on feed between Apr. 1 and June 30, '63) NUMBER c. More than 6 months (placed on feed before April 1, 1963) NUMBER	
10.	How many pounds of the following were fed yesterday to the CATTLE and CALVES BEING FATTENED for SLAUGHTER MARKET? a. Grain (Kind) POUNDS b. Protein supplements POUNDS c. Hay POUNDS d. Silage POUNDS e. Other feed (Kind) POUNDS	
11.	How many of the CATTLE and CALVES BEING FATTENED October 1, will be marketed during each of the following months: a. October NUMBER b. November NUMBER c. December NUMBER d. Later NUMBER	
12.	How many grain FED cattle did you MARKET FOR SLAUGHTER between July 1, '63 and Oct. 1, '63? (If none report "0") NUMBER a. Of this number marketed, how many were put on grain feed after July 1, '63? (If none report "0") NUMBER b. Of the fed cattle reported marketed in question 12, how many were marketed in each of the following months: July NUMBER August NUMBER September NUMBER	

Over, please

Report For Your Own Operations		Answer here ↓
13.	Of the CATTLE and CALVES BEING FATTENED October 1 (item 8) how many are: a. Steers and steer calves NUMBER b. Heifers and heifer calves NUMBER c. Cows, bulls and other NUMBER	
14.	Of the STEERS and STEER CALVES reported in part a of question 13, how many are in each of the following weight groups? a. Under 500 Pounds NUMBER b. 500 to 699 Pounds NUMBER c. 700 to 899 Pounds NUMBER d. 900 to 1099 Pounds NUMBER e. 1100 Pounds and over NUMBER	
15.	Of the HEIFERS and HEIFER CALVES reported in part b of question 13, how many are in each of the following weight groups? a. Under 500 Pounds NUMBER b. 500 to 699 Pounds NUMBER c. 700 to 899 Pounds NUMBER d. 900 to 1099 Pounds NUMBER e. 1100 Pounds and over NUMBER	
16.	Of the COWS, BULLS and OTHER CATTLE reported in part c of question 13, how many are in each of the following weight groups? a. Under 500 Pounds NUMBER b. 500 to 699 Pounds NUMBER c. 700 to 899 Pounds NUMBER d. 900 to 1099 Pounds NUMBER e. 1100 Pounds and over NUMBER	

Over, please
Thank you

Exhibit 26

1962 ACREAGE SURVEY

POSTAGE AND FEES PAID
U.S. DEPT. OF AGRICULTURE

Budget Bureau No. 40-R123.6.
Approval expires Nov. 30, 1964.

31

31. Are any of the following
kept on this farm now?
(Check yes or no)

Cattle and
calves.....Yes ☐ No ☐
Milk cows.....Yes ☐ No ☐
Hogs and pigs....Yes ☐ No ☐
Sheep and
lambs.....Yes ☐ No ☐
Chickens (hens,
pullets, etc.)...Yes ☐ No ☐

For Your Information

Your answers to these questions are needed to make a good cross-section survey of acreages of crops harvested throughout the country. Facts about your farm will be used only in combination with similar information being requested from 600,000 other farmers, and will be kept confidential. These reports directly from farmers are the basis for official estimates of harvested acreages within your State and for the country as a whole. National and State figures based on this survey will be published by the Crop Reporting Board.

For more information about any crop or livestock report, write to your State agricultural statistician.

Please help your carrier by filling out this card completely at once and returning it to him promptly. No stamp is required.

INSTRUCTIONS

(For making entries on other side of card)

Give the information as **accurately** and **completely** as possible. Where acreages are not definitely known make careful estimates.

Acreage of all land in the farm you are operating (Item 1 on other side). Include all land whether cropland rented from others, idle, fallow or in Conservation Reserve, pasture, woodland or other unimproved land and land occupied by farm buildings, yards, fences, etc.

Acreage of crops harvested.—Report for each crop you grow, the acres that were cut, dug, picked, or otherwise **harvested**, including any still to be harvested.

Explanation or comments:

Exhibit 27

U. S. DEPARTMENT OF
AGRICULTURE
Statistical Reporting Service
MILK PRODUCTION INQUIRY



Dear Sir:

Answers to the questions on this form are being requested to provide information on milk production and dairy practices.

Please answer at least the first three questions, even though you have only one or two cows or your cows are all dry. Be sure to report "0" when answer is "none."

Please return this form as soon as possible in the enclosed envelope, which requires no stamp. Individual reports will be held confidential.

Respectfully,

G. D. Simpson

G. D. Simpson
Chairman, Crop Reporting Board

SPECIAL INSTRUCTIONS

Item

- (2) In reporting on cows, do not include heifers that have not yet freshened.
- (3) In reporting on milk production, include all milk drawn, whether used on farm or sold, but do not include milk sucked by calves.
- (4) Report total quantity fed to all milk cows yesterday, not pounds per milk cow.
- (5) If feed was purchased, report price paid; if home-grown, estimate price it would bring locally; if a mixture of purchased and home-grown, estimate average value.

33

COMMENTS:

Name _____

Post Office _____

State _____

C.E. 9-153a

Budget Bureau No. 40-R071.7
Approval expires Feb. 28, 1966
May 1, 1963

Please Answer These Questions For The Form You Operate		Answer here ↓																																			
COWS AND MILK PRODUCTION																																					
1. COWS MILKED on this farm yesterday	NUMBER																																				
2. ALL MILK COWS on this farm yesterday (both dry and in milk)	NUMBER																																				
3. MILK PRODUCED on this farm yesterday (Report only one day's production) Report in either unit	} GALLONS or POUNDS																																				
CONCENTRATES FED YESTERDAY																																					
4. Total quantity of GRAIN and other CONCENTRATES fed yesterday to all milk cows on this farm (both dry and in milk)	POUNDS																																				
5. Value of the grain and other concentrates being fed to milk cows on this farm	per 100 pounds	\$																																			
6. Quantity of each kind of GRAIN and other CONCENTRATES fed yesterday to all milk cows on this farm:	Answer here ↓ <table border="1"> <thead> <tr> <th>Home Grown</th> <th>Purchased</th> </tr> </thead> <tbody> <tr> <td>Corn, whole or ground</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Oats, whole or ground</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Barley, whole or ground</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Wheat, whole or ground</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Sorghum grain</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Soybeans or soybean meal</td> <td>POUNDS</td> <td></td> </tr> <tr> <td>Wheat bran, shorts, or middlings</td> <td>POUNDS</td> <td>XXXX</td> </tr> <tr> <td>Beet pulp (dried)</td> <td>POUNDS</td> <td>XXXX</td> </tr> <tr> <td>Commercial mixed feed or supplement</td> <td>POUNDS</td> <td>XXXX</td> </tr> <tr> <td></td> <td>Protein content</td> <td>XXXX %</td> </tr> <tr> <td>Other grains and concentrates (Specify _____)</td> <td>POUNDS</td> <td></td> </tr> </tbody> </table>		Home Grown	Purchased	Corn, whole or ground	POUNDS		Oats, whole or ground	POUNDS		Barley, whole or ground	POUNDS		Wheat, whole or ground	POUNDS		Sorghum grain	POUNDS		Soybeans or soybean meal	POUNDS		Wheat bran, shorts, or middlings	POUNDS	XXXX	Beet pulp (dried)	POUNDS	XXXX	Commercial mixed feed or supplement	POUNDS	XXXX		Protein content	XXXX %	Other grains and concentrates (Specify _____)	POUNDS	
Home Grown	Purchased																																				
Corn, whole or ground	POUNDS																																				
Oats, whole or ground	POUNDS																																				
Barley, whole or ground	POUNDS																																				
Wheat, whole or ground	POUNDS																																				
Sorghum grain	POUNDS																																				
Soybeans or soybean meal	POUNDS																																				
Wheat bran, shorts, or middlings	POUNDS	XXXX																																			
Beet pulp (dried)	POUNDS	XXXX																																			
Commercial mixed feed or supplement	POUNDS	XXXX																																			
	Protein content	XXXX %																																			
Other grains and concentrates (Specify _____)	POUNDS																																				
ROUGHAGE FED DURING WINTER																																					
7. Quantity of each kind of roughage fed and to be fed to milk cows on this farm during the October-May winter feeding season:	Answer here ↓ <table border="1"> <thead> <tr> <th>Home Grown</th> <th>Purchased</th> </tr> </thead> <tbody> <tr> <td colspan="2">HAY</td> </tr> <tr> <td>Alfalfa or mixed alfalfa hay</td> <td>TONS</td> <td></td> </tr> <tr> <td>Clover or mixed clover hay</td> <td>TONS</td> <td></td> </tr> <tr> <td>Other hay (Specify _____)</td> <td>TONS</td> <td></td> </tr> <tr> <td colspan="2">SILAGE</td> </tr> <tr> <td>Corn silage</td> <td>TONS</td> <td></td> </tr> <tr> <td>Sorghum silage</td> <td>TONS</td> <td></td> </tr> <tr> <td>Grass (including legume) silage</td> <td>TONS</td> <td></td> </tr> <tr> <td>Other silage (Specify _____)</td> <td>TONS</td> <td></td> </tr> </tbody> </table>		Home Grown	Purchased	HAY		Alfalfa or mixed alfalfa hay	TONS		Clover or mixed clover hay	TONS		Other hay (Specify _____)	TONS		SILAGE		Corn silage	TONS		Sorghum silage	TONS		Grass (including legume) silage	TONS		Other silage (Specify _____)	TONS									
Home Grown	Purchased																																				
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Sorghum silage	TONS																																				
Grass (including legume) silage	TONS																																				
Other silage (Specify _____)	TONS																																				

Exhibit 28

U. S. DEPARTMENT OF
AGRICULTURE
Statistical Reporting Service

MILK PRODUCTION INQUIRY



Dear Sir:

Answers to the questions on this form are being requested to provide information on milk production and dairy practices.

Please answer at least the first three questions, even though you have only one or two cows or your cows are all dry. Be sure to report "0" when answer is "none."

Please return this form as soon as possible in the enclosed envelope, which requires no stamp. Individual reports will be held confidential.

Respectfully,

G. D. Simpson

G. D. Simpson
Chairman, Crop Reporting Board

SPECIAL INSTRUCTIONS

Item

- (2) In reporting on cows, do not include heifers that have not yet freshened.
- (3) In reporting on milk production, include all milk drawn, whether used on farm or sold, but do not include milk sucked by calves.
- (4c) Include milk from which the cream was used as food, but do not include milk from which the cream was used for butter.
- (6) Include not only your own family but also hired help, croppers, and tenants and their families unless they are securing milk elsewhere.
- (7) Include retail sales on your own milk routes or at the farm, and sales direct to stores, restaurants, hotels, etc.
- (8) Report total quantity fed to all milk cows yesterday, not pounds per milk cow.
- (9) If feed was purchased, report price paid; if home-grown, estimate price it would bring locally; if a mixture of purchased and home-grown, estimate average value.

12

Budget Bureau No. 40-R071.7
Approval expires Dec. 31, 1966

C.E. 9-154

August 1, 1963

Please Answer These Questions
For The Farm You Operate

Answer
here
↓

COWS AND MILK PRODUCTION

- | | | |
|--|-------------------------|--|
| 1. COWS MILKED on this farm yesterday | NUMBER | |
| 2. ALL MILK COWS on this farm yesterday
(both dry and in milk) | NUMBER | |
| 3. MILK PRODUCED on this farm yesterday
(Report only one day's production)
Report in either unit | GALLONS
or
POUNDS | |

SALES AND USE OF MILK

- | | | |
|--|---------------------------------------|--|
| 4. Of the milk produced on this farm yesterday, how much was:
(Account for all milk produced) | Answer here
↓
GALLONS or POUNDS | |
| a. Sold as whole milk, or separated for sale as cream | | |
| b. Used or will be used for making butter on this farm | | |
| c. Used as whole milk for food or drink by people on this farm (Do not include milk purchased) | | |
| d. Fed as whole milk (unskimmed) to calves or other livestock on this farm (Do not include milk sucked.) | | |
| 5. SKIM MILK or BUTTERMILK used for food and drink yesterday by people on this farm. (Do not include skim milk fed to livestock) | GALLONS or QUARTS | |
| 6. PEOPLE, including children of all ages, now on this farm | NUMBER | |
| 7. Of the milk produced on this farm yesterday how much did you sell direct to consumers | QUARTS | |

CONCENTRATES FED YESTERDAY

- | | | |
|---|-------------------|--|
| 8. Total quantity of GRAIN, and other CONCENTRATES fed yesterday to all milk cows on this farm (both dry and in milk) | POUNDS | |
| 9. Value of the grain and other concentrates being fed to milk cows on this farm | per 100 pounds \$ | |

COMMENTS:

Exhibit 29

C. E. 9-260a

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICEBudget Bureau No. 40-R059.10
Approval Expires Dec. 31, 1965

193

MONTHLY REPORT OF FLUID MILK PRICES

AUGUST 1963

TO FLUID MILK HANDLERS: The reports of fluid milk dealers, producer and distributor organizations, and others are used in compiling the Monthly Fluid Milk and Cream Report released for use of the trade, the producers, and others interested in market milk prices. Its continued usefulness depends upon adequate reports from all sources. Your reply SHOULD BE MAILED BEFORE THE SEVENTH OF THE MONTH in the enclosed envelope which requires no stamp. Please supply such of the information requested as applies to your territory.

Designate Date to Which Prices Apply if Different From Period for Which Asked

E. D. Simpson
Chairman,
Crop Reporting Board

SECTION I - DEALERS' BUYING PRICES FOR MILK PURCHASED EARLY IN AUGUST 1

CLASS	Price per hundredweight f.o.b. city	Premium per hundredweight	Basic fat test	Milk-fat differential	Date of price or premium change ²
1. Milk bought for distribution as FLUID MILK (In Federal or State order markets show Class) price computed under the Order)	Dollars	Cents	Percent	Cents	
2. PREMIUMS on above milk:					
a. NEGOTIATED above Federal or State order prices.....					
b. BULK TANK					
c. OTHER TYPE (specify).....					
3. Milk bought for distribution as FLUID CREAM Report even if same as for fluid milk					
4. Milk bought on FLAT BASIS (Report flat price)...					

¹ If not currently determined for your market, please indicate here the month to which the prices apply.² If any of the above prices or premiums changed during the preceding month or will be changed in the current month, please show the effective date.

IMPORTANT: If any prices changed during the preceding month, or will be changed in the current month, please show the effective date _____.

SECTION II - PRICES FOR WHOLE MILK AT HOMES AND STORES

CONTAINER SIZE AND GRADE OF MILK	RETAIL DELIVERY TO HOMES					PURCHASED BY CONSUMERS IN STORES				
	Price paid per single container		Discount for quantity delivery ¹		Fat Test	Price paid at independent stores		Price paid at chain and dairy stores		Fat Test
	Glass	Paper	No. units	Cents per unit		Glass	Paper	Glass	Paper	
PER QUART	Cents	Cents	Number	Cents	Percent	Cents	Cents	Cents	Cents	Percent
Cream line or regular...										
Homogenized										
Homogenized Vitamin D										
PER HALF GALLON										
Cream line or regular...										
Homogenized										
Homogenized Vitamin D										
PER GALLON										
Cream line or regular...										
Homogenized										
Homogenized Vitamin D										

¹ Minimum number of units (quarts, half gallons, gallons) required to obtain specified discounts in cents per unit.

Exhibit 30

AUGUST 1963

SECTION III — PRICES FOR WHOLE MILK AT WHOLESALE

TYPE OF SALE AND UNIT SIZE (Report price for most common grade or volume item in the market)	TO HOTELS, RESTAURANTS, HOSPITAL, ETC.	TO STORES	
		Glass	Paper
Sold To Stores:	Dollars	Cents	Cents
Per quart container			
Per half gallon container			
Per gallon container			
Sold in Bulk:			
Per gallon			
Per gallon in dispenser units			

IMPORTANT: If any prices changed during the preceding month, or will be changed in the current month, please show the effective date _____.

SECTION IV — PRICES FOR MILK AND CREAM PRODUCTS AT HOMES AND STORES

PRODUCT	PRICE PAID PER SINGLE CONTAINER DELIVERED TO HOMES		PURCHASED BY CONSUMERS IN STORES				Fat test
			Price paid at Independent stores		Price paid at chain and dairy stores		
	Glass	Paper	Glass	Paper	Glass	Paper	
SPECIAL GRADES OF MILK	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Percent</i>
Homogenized vitamin mineral..... per qt.							
Grade A (Special fat and bacteria standards) per qt.							
Breed milk (Give name_____) per qt.							
Other (Give name of grade) _____ per qt.							
_____ per qt.							
Certified milk..... per qt.							
CREAM AND MIXTURES							
Half-and-half..... per pt.							
Table cream per ½ pt.							
Whipping cream..... per ½ pt.							
CREAMED COTTAGE CHEESE							
Per 12-ounce package							
Per pound package							
Other sizes (specify).....							

COMMENTS: (Please describe unusual situations in the market) _____

(Firm name)

(Signature of person reporting)

(Date)

(Official title or position)

Exhibit 31

C.E. 9-213

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICEIN COOPERATION
WITHWISCONSIN STATE DEPT. OF
DIVISION OF AGRICULTURE

ANNUAL REPORT OF WISCO

THIS REPORT IS REQUIRED FROM AL
BY LAW (SECTION 93.0

REPORT FOR EACH ITEM AND SHOW DISPOSITION OF TOTAL RECE

Please make necessary corrections in name and address

Item No.	MILK AND CREAM RECEIPTS	TOTAL FOR YEAR	JANUARY	FEBRUARY	MARCH
Receipts from Farmers					
1	Whole milk received from farmers	lb.			
2	Total pounds of milkfat in above milk (or average test)	lb. (or %)			
3	Total dollars paid to farmers ¹	dol.			
4	Butterfat in cream received from farmers	lb.			
5	Total dollars paid to farmers for above cream ¹	dol.			
6	Number of patrons supplying milk and cream each month	no.	XXXXXXXXXXXXXX		
Receipts From Other Stations and Plants					
7	Whole milk received from other stations and plants	lb.			
8	Skim milk received from other stations and plants	lb.			
9	Butterfat in cream received from other stations and plants (include whey cream butterfat)	lb.			
10	Other types of receipts (give kind)	lb.			
MILK AND CREAM SHIPMENTS AND SALES					
11	Whole milk shipped to plants in Wisconsin	lb.			
12	Whole milk shipped to plants outside of Wisconsin	lb.			
13	Skim milk shipped to other plants and stations	lb.			
14	Butterfat in cream shipped to plants in Wisconsin (exclude whey cream butterfat)	lb.			
15	Butterfat in cream shipped to plants outside of Wisconsin (exclude whey cream butterfat)	lb.			
16	Butterfat in whey cream shipped to plants in Wisconsin	lb.			
17	Butterfat in whey cream shipped to plants outside of Wisconsin	lb.			
18	Whole milk sold for fluid consumption in bottles or other containers (10 gallons or less, include flavored whole milk)	qt.			
19	Cream sold for fluid consumption in bottles or other containers (10 gallons or less)	qt.			
PRODUCTS MANUFACTURED					
Butter					
20	Butter (include whey butter, also include butter custom churned for others)	lb.	001		
Frozen Products					
21	Ice cream (include ice cream used in novelties)	gal.	027		
22	Ice milk and freezer-made milkshake (2.0 to 7.0 percent fat, include ice milk used in novelties)	gal.	227		
23	Milk sherbet (include sherbet used in novelties)	gal.	127		
24	Water ices (include popples. See instruction 7d)	gal.	827		
Mix for frozen products					
25	Ice cream mix made (Total manufactured, including for own use and for sale)	gal.	063		
26	Ice cream mix purchased	gal.			
27	Ice milk mix and milkshake mix made	gal.	628		
28	Milk sherbet mix made	gal.	528		
Natural Cheese					
29	American Cheddar cheese	lb.	003		
30	Colby washed or stirred curd, Jack or Monterey cheese	lb.	403		
31	Swiss cheese	lb.	006		
32	Hummer cheese	lb.	007		
33	Brick cheese	lb.	107		
34	Limburger cheese	lb.	008		
35	All Italian types of cheese	lb.	110		
36	Blue mold cheese (Roquefort and Gorgonzola types)	lb.	210		
37	Cottage cheese curd made in this plant (See instruction 9a)	lb.	009		
38	Cottage cheese, creamed (4% to 20% fat, include production both from curd made in this plant and from curd received from other plants. See instruction 9b)	lb.	109		
39	All other types of cheese { give name } Fat content %	lb.	010		
Condensed or Evaporated Products					
40	Sweetened condensed whole milk, case goods	lb.	012		
41	Sweetened condensed whole milk, bulk goods ²	lb.	016		
42	Sweetened condensed skim milk, bulk goods ²	lb.	018		
43	Unsweetened (plain) condensed whole milk, bulk goods ²	lb.	017		
44	Unsweetened (plain) condensed skim milk, bulk goods ²	lb.	019		
45	Evaporated whole milk (unsweetened) case goods	lb.	013		
46	Concentrated skim milk for animal feed	lb.	029		
47	Condensed whey	lb.	222		
Dry Products					
48	Nonfat dry milk for human food (spray process)	lb.	324		
49	Nonfat dry milk for human food (roller process)	lb.	424		
50	Nonfat dry milk for animal feed (dry skim milk)	lb.	224		
51	Dry whole milk	lb.	023		
52	Dry buttermilk	lb.	022		
53	Dry whey	lb.	122		
54	Malted milk powder	lb.	025		
55	Other Dairy Products Manufactured (Give name and unit)				
56					

¹ Total dollars paid should be reported f.o.b. this intake. If actual total is not available, please show actual price per hundredweight of milk paid to farmers for actual test of milk received.² Include all bulk condensed milk produced for sale or for use in own plant(s) for manufacturing other dairy products, except for canning.

Exhibit 32

Mail this Report
by Friday night

UNITED STATES DEPARTMENT OF AGRICULTURE
Statistical Reporting Service
Agricultural Estimates Division
Chicago 80, Illinois

Budget Bureau No. 40-R, 1404.7.
Approval expires Jan. 31, 1965.

WEEKLY REPORT OF BUTTER PRODUCTION AND MILK USED FOR AMERICAN CHEESE

1. **BUTTER** made at this plant during the week (7 days) ending Thursday, May 30, 1963-----lbs. Butter
2. **MILK** (whole or standardized) USED in making AMERICAN CHEESE
(Cheddar, Colby, and Washed Curd) at this plant during the week
(7 days) ending Thursday, May 30, 1963-----lbs. Milk

Explain any extreme change in production

(Signature of person making report)

(Date)

C.E. 9-273

(Over)

C. E. 9-274
U. S. DEPT. OF AGRICULTURE
Statistical Reporting Service
P. O. Box 6910A
Chicago 80, Illinois

REPORT OF FROZEN DESSERT PRODUCTION

JUNE 1963

Budget Bureau No. 40-R-037.8
Approval expires 6-30-64

SEE REVERSE SIDE FOR DETAILED INSTRUCTIONS

Please mail by July 10th. Use the accompanying
addressed envelope which needs no stamp.

Change address below, if incorrect.

(OVER)

**FROZEN DESSERT PRODUCTS MADE AT THIS
PLANT IN JUNE 1963** GALLONS

1. How much ICE CREAM?-----
2. How much ICE MILK MIX and
MILKSHAKE MIX?-----
3. How much ICE MILK?-----
4. How much MILK SHERBET?-----
5. How much MELLORINE or other frozen
desserts made with fats and oils other
than milkfat?-----
6. How much WATER ICE?-----

Signature _____

Title _____ Date _____

C. E. 9-275
U. S. DEPT. OF AGRICULTURE
Statistical Reporting Service
P. O. Box 6910A
Chicago 80, Illinois

COTTAGE CHEESE PRODUCTION REPORT

JUNE 1963

Budget Bureau No. 40-R-2902.2
Approval expires Jan. 31, 1965

COTTAGE CHEESE CURD

June 1963
Pounds

1. How much UNCREAMED cottage cheese
CURD, including pot and bakers' cheese,
was produced in this plant?-----
2. How much UNCREAMED CURD was
bought or transferred from other plants or
taken out of storage?-----
3. How much UNCREAMED CURD was
sold or transferred to other plants, or placed
in storage for later use?-----
4. How much UNCREAMED CURD was
sold to hotels, restaurants, stores, bakeries,
delivered on retail routes, etc.?-----

CREAMED COTTAGE CHEESE

June 1963
Pounds

5. How much FULLY CREAMED cottage
cheese (4 percent fat and over) was made
in this plant (Total weight after creaming)?--
6. How much PARTIALLY CREAMED cot-
tage cheese (less than 4 percent fat) was
made in this plant (Total weight after
creaming)?-----

Signature _____

Title _____ Date _____

SEE REVERSE SIDE FOR DETAILED INSTRUCTIONS

Exhibit 33

CEX 309

1300-A New P. O. Bldg.,

Tel: WA 2-9200

Ext. 865

UNITED STATES DEPARTMENT OF AGRICULTURE

STATISTICAL REPORTING SERVICE

AGRICULTURAL ESTIMATES DIVISION

CHICAGO 7, ILLINOIS

Budget Bureau No.

40-R 1762.6

Appr. Exp. 3-31-66

WEEKLY RECEIPTS AND STORAGE STOCKS REPORT OF AMERICAN CHEESE

For week ending _____

Please mail this report promptly Friday evening to Agricultural Statistician, Post Office Box 6910-A, Chicago 80, Illinois. (See back of this page for instructions). Use the accompanying addressed envelope, which needs no stamp.

RECEIPTS, DELIVERIES, AND STOCKS OF AMERICAN NATURAL CHEESE (Cheddar, Colby, Washed Curd, etc.) by style:

STYLE (Do not include processed)	Received directly from factories and made at this plant during week	Received from dealers, other branches, or storage warehouses during week	Delivered during week	Total stocks on hand at close of business Friday
	(1)	(2)	(3)	(4)
FLATS boxes				
TWINS boxes				
CHEDDARS boxes				
20-lb. BLOCKS boxes				
40-lb. BLOCKS boxes				
60-lb. BLOCKS boxes				
SINGLE DAISIES boxes				
TRIPLE DAISIES boxes				
YOUNG AMERICAS boxes				
LONGHORNS boxes				
SQUARE PRINTS (2 to box) boxes				
MIDGETS (2 to box) boxes				
2-lb. LOAF NAT. (12 to box) boxes				
5-lb. LOAF NAT. (4 to box) boxes				
MAMMOTHS (Show 100, 150, 300# or other separately.)	No. Wt.	No. Wt.	No. Wt.	No. Wt.
	No. Wt.	No. Wt.	No. Wt.	No. Wt.
	No. Wt.	No. Wt.	No. Wt.	No. Wt.
	No. Wt.	No. Wt.	No. Wt.	No. Wt.
BARRELS	No. Wt.	No. Wt.	No. Wt.	No. Wt.
	No. Wt.	No. Wt.	No. Wt.	No. Wt.
OTHER (specify style)	No. Wt.	No. Wt.	No. Wt.	No. Wt.
	No. Wt.	No. Wt.	No. Wt.	No. Wt.

DATE _____

SIGNED

BY _____

Exhibit 34

Budget Bureau No. 40-R537.16
Approval Expires, Jan. 31, 1967

UNITED STATES DEPARTMENT OF AGRICULTURE

Statistical Reporting Service
Agricultural Estimates Division
Room 1300-A, New Post Office Building
Chicago 7, Illinois

MONTHLY DAIRY PRODUCTS REPORT

**See Instructions
On Reverse Side**

Section I—Receipts of Manufacturing Grade Milk—June 1963

Items	Quantity 1/ Pounds	Milkfat test Percent	Quantity of 1/ milkfat Pounds	Total amount paid 2/ Dollars
1. Whole Milk of manufacturing grade received from farmers and your receiving stations. (Do not include surplus fluid market milk)				

1/ Do not include receipts from other receiving stations or other plants.

2/ Total dollars paid should be reported F.O.B. plant or your receiving stations, whichever is the customary point for determining prices to producers and before hauling costs are deducted. Include quantity, quality, bulk tank, or any other premiums.

Section II—Products Manufactured from Milk and Cream of All Grades and from All Sources—June 1963

PRODUCT	CODE NO.	PRODUCTION
BUTTER		Pounds
1. Butter (Include whey and custom churned butter)-----	001	
CHEESE		
2. American Cheddar Cheese-----	003	
3. Colby, washed or stirred curd, Jack or Monterey cheese-----	403	
4. American type part-skim cheese-----	004	
5. American type full-skim cheese-----	005	
6. Swiss Cheese----- (Estimate for June)	006	
7. Munster Cheese ----- " " "	007	
8. Brick Cheese ----- " " "	107	
9. Limburger Cheese ----- " " "	008	
10. Cream Cheese (Not less than 33% fat)-----	209	
11. Neufchatel Cheese (20 to 32.9% fat)-----	309	
12. Italian types of cheese-----	110	
13. Blue Mold Cheese (Roquefort type)-----	210	
14. Other varieties not listed above (Specify----- (Do not report cottage cheese)	010	
FROZEN PRODUCTS		Gallons
15. Ice Cream (Include ice cream used in novelties)-----	027	
16. Milk sherbet (Include sherbet used in novelties)-----	127	
17. Other frozen dairy products (see instructions 6c)----- (Specify _____) (_____ % fat)	727	

The above report should be completed and mailed not later than the 15th of July if at all possible, to the United States Department of Agriculture, Post Office Box 6910-A, Chicago, Illinois. The enclosed return envelope which requires no stamp may be used in returning your report.

(Signature of person making report)

(Position or title)

(Date)

Please make necessary corrections in name and address.

Exhibit 35

C. E. 9-251

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICEBudget Bureau No. 40-R02L 10
Approval expires Jan. 31, 1964

36

MONTHLY EVAPORATED AND CONDENSED MILK REPORT

SEPTEMBER 1963

The data requested are to be used in compiling the Monthly Evaporated and Condensed Milk Report issued by this Service. Please fill out promptly and mail in the enclosed envelope. Nostamp is required.

I. PRODUCTION AND STOCKS OF EVAPORATED AND CONDENSED MILK (CASE GOODS)

Report production of evaporated and condensed milk for all of your plants during the month specified. Report all stocks in your possession, whether stored at your main plant or branch plants, whether manufactured by you or purchased from others, whether in storage or in transit (unsold) to storage, and whether sold or contracted for sale but not delivered.

PRODUCTS	PRODUCTION	STOCKS
	September, this year	September 30, this year
	Pounds	Pounds
Evaporated whole milk (unsweetened), Case Goods.....		
Condensed whole milk (sweetened) Case Goods.....		

II. MANUFACTURERS' WHOLESALE PRICES (CARLOT BASIS)
FOR UNSWEETENED EVAPORATED WHOLE MILK

Report for each geographic area in which sales were made during the above month, the average or range of prices received from wholesale grocers, chain-store operators, and similar buyers for unsweetened evaporated whole milk of United States Pure Food Standard quality delivered at manufacturers' distributing points on a cash basis. See back of this form for the States in each geographic region.

PRICE PER CASE OF FORTY-EIGHT 14 OUNCE CANS DURING SEPTEMBER THIS YEAR

New England	Middle Atlantic	South Atlantic	East North Central	West North Central	South Central	North- western	South- western
Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars

NOTE: If there were changes in the above prices during the month, please show the effective date or dates.

III. MANUFACTURING MILK RECEIPTS AND AMOUNT PAID PRODUCERS

Report for each factory the quantity of whole milk for manufacturing received from producers and your own receiving stations for use in the production of canned evaporated and/or condensed milk, the quantity of milkfat and the total amount paid for the milk. Do not include surplus Grade A milk. The total AMOUNT PAID should be f.o.b. plant or your receiving stations, whichever is the customary point for determining prices to producers; show total before hauling costs are deducted and include quantity, quality, bulk tank, or any other premiums.

LOCATION OF FACTORY (Give Town and State)	Quantity of whole milk received during September from farmers and your own receiving stations for canning	Total butterfat in milk received in September for canning	Total amount paid for milk received in September for canning (including premiums and hauling costs)
	Pounds	Pounds	Dollars

Total quantity of milk purchased from producers for all purposes during the past month. _____ 1b.

Total number of individual producers from whom the above milk was purchased No.

Please make necessary corrections in name and address

<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	(Name of concern)
	(Signature of person making report)
	(Position or connection with concern)
	1963
<div style="display: flex; justify-content: space-between;"> (month) (day) </div>	

Exhibit 36

C. E. 9-252

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICE
WASHINGTON 25, D. C.

56 Budget Bureau No. 40-R024, 14
Approval expires January 31, 1965

MANUFACTURER'S DRY MILK REPORT, SEPTEMBER 1963

(Report for all plants of your entire firm. See other instructions on reverse side.)

Your cooperation in filling out this form and returning it to the United States Department of Agriculture is requested. Individual reports will be considered as confidential and will not be used in such a way as to disclose company operations. Please return your report promptly in the enclosed official envelope which does not require a stamp. Please use ink or typewriter.

PRODUCTION, SHIPMENTS, PRICES, AND STOCKS OF DRY MILK PRODUCTS, SEPTEMBER 1963

I. (A) SPRAY PROCESS NONFAT DRY MILK FOR HUMAN FOOD

RECEIPTS FROM OUTSIDE SOURCES	PRODUCTION	SHIPMENTS (Including L.C.L. and truck deliveries)				STOCKS ON HAND SEPTEMBER 30 THIS YEAR	
		RETAIL PACKAGES		ALL OTHER PACKAGES IN- CLUDING BARRELS, DRUMS AND BAGS			
		QUANTITY	AV. PRICE PER POUND	QUANTITY	AV. PRICE PER POUND	RETAIL PACKAGES	BULK PACKAGES, BAR- RELS, DRUMS & BAGS
Pounds	Pounds	Pounds	Cents	Pounds	Cents	Pounds	Pounds

(B) OTHER NONFAT DRY MILK PRODUCTS

TYPE OF PRODUCT	PRODUCTION	SHIPMENTS (Including L. C. L. and truck deliveries)	AVERAGE PRICE PER POUND F. O. B. FACTORY	STOCKS ON HAND SEPTEMBER 30 THIS YEAR
FOR HUMAN FOOD	Pounds	Pounds	Cents	Pounds
Spray process				
(1) Dry buttermilk.....				
Roller process				
(2) Nonfat dry milk.....				
(3) Dry buttermilk.....				
FOR ANIMAL FEED (Spray and roller)				
(4) Dry skim milk.....				
(5) Dry buttermilk.....				

II. DRY WHOLE MILK

PROCESS	PRODUCTION	SHIPMENTS (Including L. C. L. and truck deliveries)						TOTAL STOCKS ON HAND SEPTEMBER 30 THIS YEAR
		1-2½-POUND PACKAGES		5-POUND PACKAGES		ALL OTHER PACKAGES INCLUDING BARRELS AND DRUMS		
		QUANTITY	AV. PRICE PER POUND	QUANTITY	AV. PRICE PER POUND	QUANTITY	AV. PRICE PER POUND	
	Pounds	Pounds	Cents	Pounds	Cents	Pounds	Cents	Pounds
Spray.....								
Roller.....								

III. IF MORE THAN ONE PLANT IS COVERED IN THIS REPORT, GIVE FOLLOWING INFORMATION
ON PRODUCTION: (Account for all production reported in sections I and II, above)

NAME OF PLANT	LOCATION OF PLANT	NAME OF PRODUCT MADE	POUNDS PRODUCED		
			FOR HUMAN FOOD		FOR ANIMAL FEED
			SPRAY	ROLLER	

Please make necessary corrections in name and address

(Name of firm)

(Signature of person making report)

(Position or title)

(Date)

Exhibit 37

UNITED STATES DEPARTMENT OF AGRICULTURE
Statistical Reporting Service
Chicago 80, Illinois

Budget Bureau No. 40-R622.9
Approval Expires March 31, 1966

Please Mail Not
Later than
April 27, 1963

NONFAT DRY MILK REPORT FOR THE MONTH BEGINNING MARCH 26, 1963
AND ENDING APRIL 25, 1963

To Nonfat Dry Milk Manufacturers:

The information asked for below is needed by the administrators of the Federal milk marketing orders for determining in various milk market areas the prices to be paid for certain classes of milk used for purposes other than fluid consumption. You are earnestly urged to cooperate by supplying all information requested, whenever applicable to your operations, and forward the completed forms to U.S. Statistical Reporting Service, Box 6910-A, New Post Office Building, Chicago 80, Illinois. An addressed envelope, which requires no stamp, is enclosed for that purpose.

CURRENT SALES OF NONFAT DRY MILK (FOR HUMAN CONSUMPTION) FOR DELIVERY
During month beginning March 26 and ending April 25

Buyer to whom shipped during this period only	SPRAY PROCESS (carlots only)		ROLLER PROCESS (carlots only)	
	Quantity sold	Average net price per lb. received	Quantity sold	Average net price per lb. received
	<u>Pounds</u>	<u>Cents</u>	<u>Pounds</u>	<u>Cents</u>
Governmental Agencies				
Wholesalers				
Direct Users				
Others				
TOTAL SALES				

Report manufacturers' net price f.o.b. factory after deduction of freight paid by manufacturers and after discounts to wholesalers.

(Name of Company)

(Signature of person making report)

(Date)

(Position or Title)

Exhibit 38

C. E. 8-56

UNITED STATES DEPARTMENT OF AGRICULTURE
STATISTICAL REPORTING SERVICEBudget Bureau No. 40-1202.23.
Approval expires 1-31-66.

Mail to:
U. S. DEPARTMENT OF AGRICULTURE
Statistical Reporting Service
Washington 25, D. C.
Att.: Cold-Storage Reports

JANUARY 31, 1963

MONTHLY COLD-STORAGE SURVEY

(This report should be mailed within 6 working days after
the close of business on the last day of the month)

JANUARY 31, 1963

Information on this report is requested of refrigerated storage facilities as defined in instruction No. 2. All reports are confidential and will be used only for statistical purposes. No disclosures will be made of the data furnished in any individual report. Please note the instructions on reverse side before completing the report.

COMMODITIES	CODE	STOCKS ON HAND END OF MONTH	COMMODITIES	CODE	STOCKS ON HAND END OF MONTH
FRESH FRUITS (INCLUDE ALL PROCESSING STOCKS)			DAIRY PRODUCTS		
Apples, total (include all stocks held for processing and for fresh market use)...bu.	10 101		Cream (not including plastic).....lb.	22 101	
Pears, Bartlett's, std. boxes, 1-way lugs, bushel baskets and canners lugs.....	10 201		Cream, plastic (75% butterfat and over).....lb.	22 102	
Pears, Bartlett's.....L. A. lugs	10 202		Butter, creamery.....lb.	22 201	
Pears, other varieties, std. boxes, 1-way lugs and bushel baskets and canners lugs.....	10 203		Condensed milk, sweetened and unsweetened (bulk goods).....lb.	12 301	
Pears, other varieties.....L. A. lugs	10 204		Evaporated and condensed milk (case goods).....lb.	12 302	
Fresh grapes.....lb.	10 301		Cheese natural: (Do not include processed cheese or processed foods and spreads)		
Other fresh fruits.....lb.	10 390		American (incl. cheddar, colby, washed curd, jack, monterey, and granular).....lb.	12 401	
			Swiss, all types.....lb.	12 402	
			Other natural varieties.....lb.	12 490	
FRESH VEGETABLES			EGGS		
Onions.....lb.	11 101		Eggs, shell.....case	13 101	
Celery.....lb.	11 102		Eggs, frozen:		
Other fresh vegetables.....lb.	11 190		Whites.....lb.	23 201	
			Yolks.....lb.	23 202	
			Whole or mixed.....lb.	23 203	
				23 204	
DRIED FRUITS AND NUTS			Total frozen eggs.....lb.	xxx xxx	
Dried and evaporated fruits, all kinds.....lb.	11 201		FROZEN POULTRY		
Nutmeats:			Broilers or fryers, chickens 42 lb. and under, per dozen.....lb.	24 101	
Peanuts.....lb.	11 301		Roasters, chickens over 42 lb., per dozen.....lb.	24 102	
Other nuts.....lb.	11 390		Hens, fowls, all weights.....lb.	24 103	
Nuts in shell:			Turkeys.....lb.	24 104	
Peanuts.....lb.	11 401		Ducks.....lb.	24 105	
Other nuts.....lb.	11 490		Unclassified frozen poultry.....lb.	24 190	

16-52189-17

THIS PORTION OF THE REPORT TO BE FILLED OUT BY PUBLIC WAREHOUSEMEN ONLY

DO NOT DETACH

SPACE AND OCCUPANCY REPORT AS OF JANUARY 31, 1963

Fill in the table below, indicating the refrigerated storage space and the space used for the storage of foodstuffs reported above.

ITEM	COOLERS (Cubic feet)	FREEZERS (Cubic feet)
Usable piling space (see instructions below).....		
Usable piling space occupied (see instructions below).....		
Additional space due to new construction since last report.....		

USABLE PILING SPACE means the storage area that can be used for storing food commodities. It is the space that remains after deducting from your gross space all space taken up by coils, aisles, posts, sprinklers, ventilation space, and the like.

USABLE SPACE OCCUPIED means the actual number of cubic feet of space being used for the storage of commodities shown on the monthly cold storage report.

Received

Edited

Punched

(SEE OTHER SIDE)

16-52189-17

Exhibit 39

C. E. 5-52
"C"
1963

UNITED STATES DEPARTMENT OF AGRICULTURE-STATISTICAL REPORTING SERVICE

PRICES PAID BY FARMERS FOR BUILDING AND FENCING MATERIAL AND FUEL

STATE REPORT SUMMARY

(Date to which data relate)

Number of questionnaires mailed

Number of questionnaires tabulated

Average date on returns

Commodity	Reports tabulated	Independent Stores				Board	
		Average		Average including sales tax ² (Tax rate _____ %)	Statistician ³	Ind. stores	Ind. & chain stores av.
		Straight	Weighted ¹				
	Number	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
FRAMING LUMBER							
2" x 4" pine, per M bd. ft.							
1. No. 2 and better							
2. Under No. 2							
3. Standard and better							
4. Utility and economy							
2" x 4" Douglas fir and hemlock, per M bd. ft.							
5. Standard and better							
6. Utility							
2" x 4" Inland fir and larch, per M bd. ft.							
7. Standard and better							
8. Utility							
2" x 4" fir or Douglas fir and Inland fir combined, per M bd. ft.							
9. Standard and better (Items 5 and 7)							
10. Utility and economy (Items 6 and 8)							
BOARDS							
Rough, 1", (random widths), common, per M bd. ft.							
11. No. 2 and better							
12. Under No. 2							
13. Standard and better							
14. Utility and economy							
Dressed, 1", S4S, (random widths), common, per M bd. ft.							
15. No. 2 and better							
16. Under No. 2							
17. Standard and better							
18. Utility and economy							
19. T & G roofers, 1" x 6", No. 2 and better, per M bd. ft.							
Shiplap, pine, per M bd. ft.							
20. No. 2 and better							
21. Under No. 2							
22. Standard and better							
23. Utility and economy							
SIDING							
Drop siding, pine, 1" x 6", [Pat. 105 or 106] per M bd. ft.							
24. C and better or C							
25. Under C or D							
Drop siding, fir, 1" x 6", [Pat. 105 or 106] per M bd. ft.							
26. C and better or C							
27. Under C or D							
28. Rustic siding, redwood, 1" x 8", FG, clear heart, per M bd. ft.							
Bevel siding, pine, 6" width, per M bd. ft.							
29. C and better							
30. Under C							
Bevel siding, cedar, 6" width, per M bd. ft.							
31. Clear							
32. B							

¹ If computed.² Weighted average where both are computed.³ Recommendation should include sales tax.

NOTE: Specifications in brackets [] not on CW schedule.

Submitted

(Date)

(State)

Exhibit 41

C.E. 5-245 { Middle Atlantic
C { North Central,
1/1/63 { Del., Md.

PLEASE MAIL ON
THE 15TH OR 16TH

2

U. S. DEPARTMENT OF AGRICULTURE
Statistical Reporting Service

Dear Reporter:

As a service to Agriculture and the general public, the Department of Agriculture collects and distributes information on prices being received by farmers for various farm products on or about the 15th of each month. Your cooperation in supplying this information for your locality will aid us in providing this service.

Your report will be combined with reports from other reporters in preparing estimates for your State and the Nation.

Please remember to:

1. Read the special instructions.
2. Mail your report promptly in the enclosed envelope which needs no stamp.

Respectfully,

G. D. Simpson

G. D. Simpson,
Chairman, Crop Reporting Board

P.S. Individual reports are kept confidential.

19

SPECIAL INSTRUCTIONS

- Only one price should be reported for each product. This should be an estimated average price of all transactions at the point of sale before any marketing deductions. It should be a price which would result if the gross amount received by farmers, before any marketing deductions, were divided by the quantity sold by them.
- Please report prices in the unit of measure shown for each product.
- Report only on items for which you know prices being received by local producers for commodities being marketed around the 15th of the current month.

COMMENTS.

Budget Bureau No. 40-R008.9
Approval expires Jan. 31, 1965

PRICES RECEIVED BY FARMERS

Please report average prices being received by farmers at the point of sale, before any marketing deductions, for all grades and qualities being sold on or about the 15th of this month.

LIVESTOCK		Answer here
HOGS, average price all grades:		
Borrows and gilts, liveweight	per cwt.	\$
Sows for slaughter, liveweight	per cwt.	\$
CATTLE and CALVES, average price all grades:		
Steers and heifers, including sale of both feeder and slaughter animals, liveweight	per cwt.	\$
Cows (excluding dairy herd replacements), liveweight	per cwt.	\$
Calves, liveweight	per cwt.	\$
SHEEP and LAMBS, average price all grades:		
Lambs, liveweight	per cwt.	\$
Sheep (exclude lambs), liveweight	per cwt.	\$
MILK COWS sold for herd replacement	average price per head	\$

POULTRY AND EGGS

CHICKENS, liveweight		
Commercial broilers and fryers	average price per lb.	\$
All other chickens (hens, roasters, and other young chickens)	average price per lb.	\$
TURKEYS, liveweight, average price for hens and toms	per lb.	\$
EGGS, all grades and sizes (exclude hatching eggs)	average price per doz.	\$

LIVESTOCK PRODUCTS

MILKFAT sold in cream	average price per lb.	\$
MILK (whole) retailed by farmers	average price per qt.	\$
WOOL, unwashed	average price per lb.	\$

HAY CROPS

ALFALFA and ALFALFA mixture, baled	average price per ton	\$
CLOVER, TIMOTHY and mixture of clover and grasses, baled	average price per ton	\$
WILD, MARSH, PRAIRIE and RANGE HAY, baled	average price per ton	\$
OTHER TAME HAY, baled	average price per ton	\$

Reported by _____ Month _____ Day _____

Exhibit 42

C.E. 5-249 { Ohio, Ind., Ill.,
D { Mich., Wisc.
1/1/63

1

PLEASE MAIL ON
THE 15TH OR 16TH

U. S. DEPARTMENT OF AGRICULTURE
Statistical Reporting Service

Dear Reporter:

As a service to Agriculture and the general public, the Department of Agriculture collects and distributes information on prices being received by farmers for various farm products on or about the 15th of each month. Your cooperation in supplying this information for your locality will aid us in providing this service.

Your report will be combined with reports from other reporters in preparing estimates for your State and the Nation.

Please remember to:

1. Read the special instructions.
2. Mail your report promptly in the enclosed envelope which needs no stamp.

Respectfully,

G. D. Simpson

G. D. Simpson,
Chairman, Crop Reporting Board

P.S. Individual reports are kept confidential.

SPECIAL INSTRUCTIONS

- Only one price should be reported for each product. This should be an estimated average price of all transactions at the point of sale before any marketing deductions. It should be a price which would result if the gross amount received by farmers, before any marketing deductions, were divided by the quantity sold by them.
- Please report prices in the unit of measure shown for each product.
- Report only on items for which you know prices being received by local producers for commodities being marketed around the 15th of the current month.

PRICES RECEIVED BY FARMERS

Please report **average** prices being received by farmers at the point of sale, before any marketing deductions, for all grades and qualities being sold on or about the 15th of this month. The reported prices should reflect premiums and discounts for test weight and moisture for grains, and other quality factors for each commodity for which you report a price.

FIELD CROPS		Answer here ↓
CORN	average price per bu.	\$
WINTER WHEAT	average price per bu.	\$
SPRING WHEAT	average price per bu.	\$
OATS	average price per bu.	\$
BARLEY	average price per bu.	\$
RYE	average price per bu.	\$
SORGHUM GRAIN	average price per cwt.	\$
FLAXSEED	average price per bu.	\$
SOYBEANS	average price per bu.	\$
BEANS, DRY EDIBLE		
White	average price per cwt.	\$
Other		
(Variety _____)	average price per cwt.	\$
POTATOES		
	average price { per bu.	\$
	or	
	per cwt.	\$
HAY CROPS		
ALFALFA and ALFALFA mixtures, baled	average price per ton	\$
CLOVER, TIMOTHY and mixtures of clover and grasses, baled	average price per ton	\$
OTHER HAY, baled	average price per ton	\$

See other side for seed and
fruit crops.

APPENDIX B. HISTORY OF CROP REPORTING IN THE UNITED STATES*

Statistical reporting of farm products evolved gradually as the country grew. From time to time the need for new kinds of agricultural statistics emerged, and, as these successive needs were supplied, statistical coverage both broadened and deepened.

In the early years, private individuals and groups sought to supply the needed data. By 1840 the Federal Government entered the picture—with the establishment of the decennial U.S. Census of Agriculture. In 1862, a statistical unit was established in the U.S. Department of Agriculture, which had just been created. This unit—now called the Statistical Reporting Service—has carried on an expanding crop and livestock reporting service ever since.

Early Non-USDA Crop Reporting Previous to 1862

When the Nation was founded, almost everyone lived in a rural area on the Atlantic Seaboard. Communities were largely self-sufficient in food, fiber, and handicrafts. There was some trading of surplus products of the land for manufactured goods. But, because most of this trading was limited to the local area, the individual had no need for crop statistics; he could assess the supply situation in his locality for himself.

By the early 1860's the face of the Nation, the economy of agriculture, and the individual farmer's ability to furnish his own necessary statistics had all drastically changed. The center of population—by then more than 30 million—had moved to southern Ohio. Farming had been developed to the Mississippi River and was pushing further westward. Freight transportation—first by river, then by canal, then by rail—kept pace along a great network of trade routes.

There were sectional surpluses of both farm and manufactured products to be exchanged. The Midwest had surplus grain and livestock, the South cotton and tobacco, and New England manufactured goods. Small-scale farmers scattered over wide areas who were producing for faraway markets required the services of middlemen specialists to collect, move, and sell their products.

As this market economy developed there was increasing need for agricultural production information to use as a basis for understanding price changes and for planning both production and distribution. And there were successively greater efforts to secure such information.

From 1840 to 1862, efforts to provide agricultural data were directed mainly to: (1) obtaining certain agricultural enumerations in each decennial U. S. Census; (2) annual postharvest estimation of agricultural pro-

duction; and (3) estimation during each growing season of preharvest crop conditions as an indication of supplies to be available at harvesttime. These three activities eventually became permanent, continuous, and expanding programs of the Federal Government.

The census enumeration, from its beginning in 1840, was the responsibility of the U.S. Bureau of the Census; it was made every 10 years until 1920, and every 5 years thereafter. Postharvest estimating was done by the Patent Office in some years from 1839 to 1862, when it was taken over by the U.S. Department of Agriculture. Little preharvest estimating was done from 1840 to 1862, but Orange Judd, editor of the *American Agriculturist*, made a notable beginning.

Agricultural census enumeration

In the Census Act of March 3, 1839, the Congress of the United States directed that "the aforesaid marshals and their assistants shall . . . also collect and return in statistical tables, under proper heads . . . all such information in relation . . . agriculture . . . as shall be directed by the President of the United States." The 1840 Census of Agriculture was the first national inventory of agriculture and, in the main, showed: (1) production of major crops (not acres) by States and (2) numbers of livestock by species. The 1840 census included 37 agricultural questions; the 1850 census, 46; and the 1860 census, 48.

No major changes were made in the U.S. agricultural census until 1880, but several minor changes were made in 1850 to improve reliability. One of these was the introduction of a questionnaire with a space for the name of the operator and the farm; another was the development of a specific set of instructions for use of United States marshals and assistant marshals who were to take the census.

Postharvest estimates

In 1839 Congress granted \$1,000 to the Patent Office fund for (1) collecting and distributing seeds, (2) prosecuting agricultural investigations, and (3) procuring agricultural statistics. From 1840 through 1848 the Patent Office made annual yearend estimates of agricultural production by States. Each year, the 1840 census data on production by States was used as a base, and to it was applied a rate of change for the year, estimated from current information. Current information was obtained from agricultural papers or journals, reports of agricultural societies, addresses, and correspondence. Use was also made of population trends,

*By Orville E. Krause.

new land developments, and improvements in transportation.

The yearly estimates were discontinued after 1848 and were not resumed until after the Department of Agriculture took over the agricultural statistical work from the Patent Office in 1862. During the interim, however, the Patent Office did engage in various forms of statistical work. Its annual reports for this period contain meteorological data, foreign trade reports, decennial census tabulations, foreign country agricultural statistics, and comments from agricultural societies and from individuals concerning the nature of the crop season and experience with various management practices and methods.

Preharvest estimates

During the 1840-62 period, demand grew for preharvest appraisals of crop conditions. A successful pioneer in this work was Orange Judd, editor of the "American Agriculturist," a monthly magazine for farmers.

Starting in the mid-1850's, Editor Judd included a section on "Reports on Crops" in his magazine during the growing season. These crop reports were very general, nonquantified comments on crops and growing conditions, based on reports from farmers in an answer to a request in his magazine for such information and on personal correspondence.

By 1862, Mr. Judd had worked out a plan for a voluntary crop reporting program that he set into motion in the March issue of his magazine. In that issue he appealed for a voluntary crop reporter from each county in the Nation. These reporters would be sent blank reporting forms to be returned by the 10th of each month in the growing season. These simple, easy-to-fill-out forms asked for acreage of and prospects for seven different crops. Each reporter was asked to enlist the aid of others so that his answers would be representative of the county.

From May through September of 1862 the "American Agriculturist" published the results of these monthly queries in tabular form. These were the first current, fairly representative, quantified crop reports published in this country. The crop report tables had a line for each county, showing the name of the county correspondent, number of his aides, and the numerical reports of each crop. Acreage was reported in tenths (i.e. 9 tenths, etc.) of the previous year and crop "appearance" in tenths of average. These indications were not converted to actual acreage or yield per acre estimates.

Mr. Judd's 1862 crop reporting program was the culmination of many years of thought and trials by various individuals and groups. It included seven important features, namely: (1) It was speedy; reports as of the 10th of the month were tabulated and published by the following month. (2) It was economical: Volunteer reporters were used and reports were mailed. (3) The questionnaire was simple and easy to answer, which

reduced reporter resistance to it. (4) Each question could be answered with a single number; therefore answers could be tabulated. (5) Both area and yield were asked, thus separating these two production components. (6) Locality change estimates were requested, thereby expanding the sample area. And (7) an effort was made toward representativeness by soliciting a reporter from each county and encouraging each county reporter to enlist aides.

USDA Crop Reporting—1862-1902

The U.S. Department of Agriculture was established May 15, 1862. Its responsibilities included the collection and distribution of annual and current agricultural statistics.

On July 1, 1862, the first Commissioner of Agriculture, Isaac Newton, was appointed. He announced that the first item on his agenda was "collecting, arranging, publishing, and disseminating, for the benefit of the nation, statistical and other useful information in regard to agriculture in its widest acceptance."

One of his first actions was to develop a corps of voluntary farm reporters, who submitted reports that were used as a basis for estimating crops. Late in 1862 these reporters were asked to report yields and prices of the major crops. The yearend tables of acreage, yield, production, price and value—published in the Department's 1862 annual report—were estimated in the following order: (1) Total production by States. This was computed by starting with the 1860 census State production figures, then estimating the 1862 production "by various means, some general, some affecting certain sections of the country, others more local, and in all cases applied as a personal knowledge and a very general acquaintance of the condition of our agriculture dictated. The result is an approximation to correctness." (2) Yield by State was estimated from farmers' reports. (3) Acreage was derived by division of production by yield. (4) Price was estimated from farmers' reports. And (5) Value was obtained by multiplying price by production.

Early in 1863, a Statistical Division was formed in the U.S. Department of Agriculture. Lewis Bohlman became the first Chief Statistician. A reporting program modeled on the plan of Orange Judd was initiated.

The first monthly Crop Report, which summarized the reports for May of about 2,000 farm correspondents, was published in July 1863.

For this first report, correspondents had been asked to estimate for their locality for each of eight crops the following: (1) average amount of land sown compared with 1862 (in tenths of 1862 acreage, i.e., 9 tenths, 11 tenths, etc.), and (2) appearance of the crop at the date of the report (in tenths of average). Figures published were the average of these reports for each State and for the Nation by type of crop. (See fig. 41.) No estimates of actual acreage and production by States during the growing season were published in the Crop Reports until more than 40 years later.

1863
MAY REPORT.

CONDITION OF THE CROPS.

	WINTER WHEAT.		SPRING WHEAT.		RYE.		CORN.		OATS.		POTATOES.		SORGHUM.		COTTON.	
	Average amount of land sown compared with 1862.	Appearance of crop at this date.	Average amount of land sown compared with 1862.	Appearance of crop at this date.	Average amount of land sown compared with 1862.	Appearance of crop at this date.	Average amount of land sown compared with 1862.	Appearance of crop at this date.	Average amount of land sown compared with 1862.	Appearance of crop at this date.	Average amount of land planted compared with 1862.	Appearance of crop at this date.	Average amount of land planted compared with 1862.	Appearance of crop at this date.	Average amount of land planted compared with 1862.	Appearance of crop at this date.
Connecticut	20	10	10	10	10	10	10	11	10	10	10	10	10	.....	.....	.....
Delaware	9	9	8	9	11	11	12	9	12	8	12	9	8	12	15	12
Illinois	12	9	12	9	9	10	11	9	10	9	11	10	16	10	79	10
Indiana	10	11	10	10	10	10	10	10	9	10	11	10	15	10	20	10
Iowa	17	10	12	11	12	10	12	11	13	11	10	10	14	11	.....	.....
Kansas	18	12	6	11	15	11	10	11	10	10	12	12	13	10	83	10
Kentucky	9	11	.....	.....	9	9	8	10	8	9	9	10	15	10	27	12
Maine .....	.....	.....	11	10	10	10	9	10	9	10	11	10	.....	.....	.....	.....
Maryland	10	10	.....	.....	10	10	10	8	9	5	11	10	16	10	20	10
Massachusetts	10	9	11	10	11	10	10	9	9	10	10	10	.....	.....	.....	.....
Michigan	11	10	10	10	10	10	10	10	11	10	11	10	25	10	50	10
Minnesota	13	11	12	11	10	10	13	10	13	10	11	10	19	10	30	10
Missouri	12	11	10	8	11	11	11	10	9	8	10	10	11	10	15	10
New Hampshire ..	10	8	11	10	10	10	9	10	12	10	11	10	.....	.....	.....	.....
New Jersey	11	11	10	10	10	10	11	10	9	10	10	10	12	10	.....	.....
New York	11	10	10	10	10	9	10	10	11	10	11	10	11	11	.....	.....
Ohio	9	8	10	10	10	9	11	10	10	9	11	10	14	10	15	10
Pennsylvania	10	10	8	10	9	9	11	9	10	10	11	9	23	9	60	10
Rhode Island	10	10	10	10	10	10	10	10	9	10	10	10	.....	.....	.....	.....
Vermont	11	19	10	10	10	10	10	11	9	11	9	10	.....	.....	.....	.....
Wisconsin	12	10	12	11	11	19	11	10	12	11	11	10	28	10	.....	.....
Nebraska Territory	15	8	11	8	8	10	8	10	10	8	10	10	9	11	.....	.....
General average ..	11	9½	10	10	10½	10	10½	9½	10.2	9½	11	10	15½	10½	37	10½

FIGURE 41.—Facsimile of a table included in the first growing season crop report issued by the U.S. Department of Agriculture in 1863.

As the growing season progressed, correspondents were asked for an appraisal of appearance of each of the eight crops as long as it remained in season. Other crops were added as they came into season, and questions were added on crop damage and disease. At the end of the year, correspondents were asked to estimate total locality production (in tenths of 1862), yield, and price.

In 1863, as in 1862, yearend estimates were made of the acreage, yield, production, price, and value of nine major crops, by States. The same procedure was followed as in 1862, except for the way production was estimated. This time, 1863 production was arrived at by estimating production by States and by commodities as a percent of 1862. Items used to arrive at the percentages included population trends, transportation development, State farm census figures, and indications from reports of farm correspondents.

In 1864 the seasonal crop reports were continued in the same form as in 1863, but for this one year they were issued only every second month. At the end of the year the annual estimates on nine crops were published again. This time, however, for production reports reliance was placed mainly on the county reporters' indications of production for 1864 (in tenths of 1863).

Livestock estimates were developed in 1864. These were based on indications of the crop reporters, who were asked to estimate the number of head of each of six types of livestock in their locality in tenths of 1861. The Washington office estimated the number of head of each type of livestock in each State for 1861 on the basis of census trends but relied on reporters to indicate the 1861-64 trend because it was assumed that normal livestock number trends were disturbed by the Civil War.

Also during 1864 the reporter corps organization was changed to the county plan. For each county, a principal correspondent was appointed who was requested to consolidate reports by other correspondents or aides within the county, then to make one report representing the whole county. This reduced the number of reports to the Washington office and made each report more representative.

During 1865 the estimating program consisted of early-year livestock estimates, growing season monthly crop reports, and the yearend report of acreage, yield, production, price, and value of the nine major crops. The January livestock report showed price and value as well as number for each of six types of livestock, by State. Numbers were estimated on the basis of

county correspondents' indications of January 1865 livestock numbers reported in tenths of the previous year. Price per head was estimated from the reported county estimate included in these same reports.

Several important developments in the estimating program took place during 1866. In the July crop report an estimate of the "condition" of crops was asked, rather than "appearance," a term that has continued to the present. Also, a reporter corps was established in all the southern States. By September all States were included in the monthly Crop Report, which was in a form that was to be little changed for many years. At the end of the year the annual crop estimates were made for all States and became the first of a series that continues today. The procedure of first estimating production on the basis of the reported current year production (in tenths of a year earlier), then deriving acreage by dividing estimated production by reported yield was to continue for many years.

Late in 1866 county correspondents reported farm wage rates for the first time. These were tabulated and published early in 1867, first of a series that appeared every few years until 1909 and annually thereafter.

In early 1867 the annual livestock tables included all States for the first time and they, too, became the first of a series that has continued annually to the present. These estimates were based on the county reports.

Thus, within about 4 years an estimating program was established that remained much the same in scope and method for the next 40 years.

Percentage estimates were begun in 1876. That is, reporters were asked to estimate acreage, total production, and numbers of livestock for their locality as a percent of the previous year rather than in tenths of the previous year and they were asked to report crop *condition* as a *percent* of average rather than in tenths of average. The change from "tenths" to percentages was made chiefly to achieve greater precision.

In 1880, the United States Agricultural Census started to enumerate crop acreages as well as production. These enumerations provided the Department's estimating service with check data for their estimates of crop acreages by States. The Department's crop estimators, however, continued to estimate crop production on the basis of reported percent change from the previous year, with a census enumeration each 10 years to establish levels. Each year the acreage estimate was derived by dividing production estimates by yields per acre estimated on the basis of reported yields.

Around 1880 also, "normal" instead of "average" became the standard by which reporters were asked to rate condition of crops. The change was made because it had been observed that reporters apparently conceived of average as more of a normal or full crop when they were asked condition as a percent of average. In average years the condition reports averaged well under 100 percent, while in better years condition reports averaged closer to 100 percent. Thus it was more realistic

to ask condition as a percent of normal. Users of the percentages would not then be misled into assuming that a reported condition below 100 percent would be less than an average yield.

During these early years there was much concern about the reliability of estimates. Efforts were made to provide county correspondents with more aides, and improved methods and techniques were promoted through suggestions to reporters in the monthly crop report publication. Also in 1882, a corps of salaried State statistical agents was appointed—one agent to a State. These agents (reporting directly to Washington) were to establish a corps of reporters across the State and make the same estimates for the whole State as the county correspondents made for whole counties. The county reporters continued to report directly to Washington. By 1882 the total number of reporters had grown to about 8,000, four times the number in 1863.

In 1889, by which time there were 12,000 regular monthly reporters, an additional list of more than 100,000 "year's end" reporters was established. According to the 1889 annual report "a list of much more than 100,000 individual farmers is drawn upon (at year's end) for specific information, and especially for areas and products of their principal crops in comparison with such data for the previous year, to test the rate of yield, as well as to show the changes in distribution of crops." Apparently these reported indications were used mainly for yearend yield per acre indications.

The method of making annual production estimates was at the beginning of a transition period at this time. Previously, complete reliance had been placed on estimates by county reporters of the total crop production for the current year as a percent of the previous year. The change in method was noted in the annual report for 1888:

"County indications are weighted to calculate State indications . . . During the season there are returns, first of area, then several consecutive returns of condition, then of yield per acre and finally of product compared with the previous year. These furnish data for three separate tests of amount of production, which are examined at the end of the season and harmonized for the final and only estimate, which has been closely foreshadowed throughout the season by the monthly reports."

This was the beginning of the evolution that led to the current procedure of calculating crop production as a product of the two separate estimates of acreage and yield. This beginning was made possible by the inclusion of crop acreages in the 1880 census, acreages which were used as benchmarks for estimating crop acreages of later years.

During these years (1862-1902) there was a continuous effort to improve the reliability of the monthly growing-season report, which continued to show by State for each crop: (1) acreage as a percent of previous year, and (2) condition as a percent of normal. Because users could easily calculate acreage and prospec-

tive yields from these indications, the report affected commodity market prices. Therefore, in the late 1800's the accuracy of the crop report indications became a subject for controversy, study, and suggestion by other sectors of the economy.

As a result of one suggestion, in 1896, the number of monthly reporters making "locality" estimates was increased from 17,000 to 45,000. To improve reliability, 28,000 town reporters were added to the 10,000 county reporters and the 7,000 who reported to the State statistical agents. The goal was to have a reporter in each township in the country. The township reports would not only be more representative of the whole country, but also each reporter would have a smaller area to estimate and probably would be more accurate.

During these years, (1862-1902) an increasing number of reports were received from handlers and processors of agricultural products. Their reports, which were used as supplementary indications, became increasingly important—particularly as postharvest check data on the amount of the crops. The additional reports included cotton ginner's reports, mill and elevator reports on cereals, and transportation agency reports on both cotton and cereals. By 1903, 61,000 public and private ginneries, 24,000 millers and elevator men, and about 22,000 agents of railroad and other transportation lines were reporting.

A further expansion of the reporting corps came in 1902 when six special full-time field agents were appointed "to watch carefully the development of each important crop throughout the entire period of its growth and to keep in close touch with the best informed opinion in regard to opinions and prospects." Each of these "roving" agents was assigned a territory and soon developed his own staff of reporters.

The special field agents were employed partly for the purpose of evaluating the extent of downward bias in reports; it had been recognized for some time that crop reporters tended to underestimate acreage when it was expressed in percentage of the acreage of the preceding year. The special agents made monthly reports similar to reports of the State statistical agents; their reports were based on observation, interviews, and information from their reporters.

By 1902 the monthly reporting corps numbered nearly 50,000. It consisted of four groups: (1) 30,000 township reporters, who reported directly to the Washington office; (2) 10,800 county correspondents and county aides—the correspondents reported directly to Washington; (3) 9,000 State aides and 38 statistical agents—the aides reported to the agents, who sent summary reports to Washington; and (4) 6 special field (or roving) agents. Separate tabulations were made each month of the indications reported by each group. In addition, 84,000 farmers reported annually on their own farming operations at the end of the growing season.

In summary: During the first 40 years of USDA's crop reporting service, percentage reports were made on the condition and acreage of major crops. At year's end, estimates were made of annual acreage, yield,

production, price, and value of major crops and of the number and value of livestock on farms, by States. Estimates were based on reports by farmers, usually called "crop reporters," most of whom received a questionnaire and made a report each month. Estimates were included in a monthly publication, which was distributed to crop reporters and others. These monthly publications also included meteorological topics. The publication had from 4 to 90 pages, the number depending on prevailing ideas and circumstances.

The number of crops for which annual estimates were made increased from 9 major crops in 1866 to 12 crops by 1904. Livestock reporting remained the same throughout the period, with yearend reports of the number and value of six major types of livestock. Farm wage rate estimates were made periodically in unchanged form, starting in 1866. Also included were answers to various current questions such as extent of drought or disease damage, published as reported.

The major new type of coverage developed during these years was the estimate of March 1 grain stocks, or carryover, on farms. This estimate showed, by State, March 1 stocks of wheat, corn, and oats on farms as a percent of the previous year's production.

By the end of this period, five major continuous programs were in operation: (1) livestock numbers (for six types) and values by States in January; (2) March 1 stocks of wheat, corn, and oats, by States, as a percent of production; (3) growing-season crop condition monthly reports, showing by States acreage as a percent of year earlier and condition as a percent of normal; (4) yearend annual report of acreage, yield, production, price, and value of principal crops; and (5) farm wage rates at intervals of several years.

USDA Crop Reporting—1903-1942

In 1903 the Division of Statistics became the Bureau of Statistics. The next 40 years saw major changes in scope of work, organization of the workers, and methods used.

Scope

Statistical coverage of both crops and livestock increased greatly both in breadth and depth. More commodities were covered, and they were reported in greater detail and with greater frequency during the production season.

By progressive steps, series of timely reports were developed that encompassed most of the important segments of agricultural statistics. These reports covered prospective and accomplished production of crops, livestock and livestock products, poultry and poultry products, dairy products, and farm disposition and time of marketing of these products. Also developed during this period were series of prices paid by farmers for production and family living items. These price series were the basis for the index of prices received and index of prices paid that were used for computing the parity ratio.

Crop estimates.—About 1907, early season estimates of actual acreage of crops, by States, replaced estimates of reported percent change. In 1911, growing-season estimates of "prospective yield" replaced estimates of reported condition as a percent of normal; the latter, however, were used as a basis for the new estimates. Growing-season production estimates were then derived from prospective yield estimates and acreage estimates.

By 1920, estimates of production were made for 29 crops, while condition was reported for 44. By 1940, quantitative estimates and progress reports had been expanded to 141 crops.

Included in the 1940 expanded coverage were 26 vegetable crops for fresh market, 11 vegetables for canning and processing, 21 fruit crops, and 4 tree nut crops. Separate seasonal reports had been developed for fresh market vegetables and the vegetables for canning and processing.

Livestock estimates.—Estimates of livestock production expanded more slowly than those for crop production because surpluses of livestock available for marketing were slower to develop. Crop production could be expanded more rapidly and with less cost than livestock; some crops in both nationwide and worldwide demand were nonperishable and could be moved great distances easily. Commerce in livestock and livestock products grew steadily, however, as population growth and development of cities increased off-farm demand. It was aided by the development of refrigerated transportation and methods of processing livestock products into nonperishable form.

By 1910 farm income from livestock products almost equalled the income from crops. Hence, there was increasing demand for livestock production and marketing information. The demand was further stimulated by World War I needs and by the postwar decline in prices of livestock products.

In 1922, livestock reports were expanded to include reports on pig crops (including intentions), lamb crops, January 1 inventories in greater detail, monthly milk cow numbers and milk production indications, and monthly hen and egg production indications. At first these reports showed only reported indications, percent change or average per farm, but within 10 years methods had been developed so that quantitative reports could be made on seasonal livestock, livestock production, and livestock product items—in addition to the January 1 inventory estimates.

Price estimates.—Before 1907 reports of prices were limited to estimates of value per head of each type of livestock on farms in January, and yearend estimates of the value per unit of the year's production of major crops. These estimates were based on reported indications.

In January 1908 reports of monthly prices of 10 major crops as of the first of each month were begun; these prices were obtained from the regular crop reporters.

In 1910 a corps of price reporters was developed, made up of country dealers and merchants who bought

farm products from farmers. This corps reported prices paid to farmers on the 15th of the month for livestock, fruit, and seed products.

Until 1923 most crop prices as of the first of the month continued to be reported by farmers and prices of livestock, fruit, and seeds as of the 15th of the month by country dealers and merchants. In 1923, all farm prices were shifted to the 15th of the month, and reporting of prices was assigned generally to country dealers and merchants.

Reports of prices paid by farmers were started in 1910; regular crop reporters were asked to report once a year the price paid for each of certain production items—such as feed, implements, and fertilizers. In 1922 the reporting was shifted to another group—mostly smalltown dealers in farmers' supplies—who were asked to report quarterly. In 1927, coverage was expanded from 100 to 175 commodities.

Organization

During these years of expanding statistical coverage, the organization of the reporting service also expanded and underwent other changes. Major developments were: establishment of a Crop Reporting Board; decentralization; and establishment of cooperative agreements with most of the States.

Crop Reporting Board.—Originally official estimates were made by the head of the crop reporting service, the head statistician, from his evaluation of reports by correspondents and State statistical agents. In 1905 a new system of evaluating these reports by a committee of five was started. This committee consisted of two section chiefs, two special field agents, and the head statistician, who was the chairman. The committee went over the material and determined the official State estimates of the various crops. Precautions, such as meeting behind locked doors, were taken to prevent any information's getting out before the proper time.

Thus was founded the Crop Reporting Board as a procedure for developing official estimates. This Board, which continues today, was prescribed by an Act of Congress in 1909.

In 1909 also, Congress passed a security law making employees subject to fine or imprisonment if they revealed crop report information or invested in the commodity market in advance of publication of the crop report. It had often been charged that, in spite of precautions taken, information had "leaked out" in advance of release time and was used to unfair advantage in the Nation's commodity markets. One such case was discovered in 1905, and this prompted the enactment of the law.

Decentralization.—Decentralization of the crop reporting work was accomplished by setting up field offices in the States and by shifting to these field offices responsibility for processing, summarizing, and analyzing the information from crop reporters.

In 1914 a full-time professional statistical agent (under Federal Civil Service) was appointed for each

major farming State. The positions of part-time State statistical agent (dating from 1882) and special field agent (dating from 1902) were abolished, and the two reporter corps formerly responsible to these agents were assigned to the new full-time professional statistical agent; these reporters were now called "field aides." The result was better qualified State office personnel and a simplified organization, both of which continue to the present.

In 1925, the corps of township reporters (established in 1896) and the corps of county reporters (established in 1863) were combined into a township reporter corps of 40,000, which reported monthly to the Washington office.

Until 1927, practically all questionnaires were sent to both the township reporters and to the lists of field aides maintained by the field offices. From 1927 to 1933 this dual reporting was abolished by a gradual transfer of the township reporters to the State offices, where they were combined with the field aide list. Almost all inquiries were then mailed from and returned to field offices for processing, summarizing, and analyzing; only the summaries and recommendations were forwarded to Washington.

Cooperative agreements.—By 1917 a number of States were already doing agricultural statistics work for their own purposes, and it became apparent that a joint Federal and State data program could improve the estimates and avoid duplication. In that year the first State-Federal cooperative agreement for agricultural statistics work was completed; within a decade 33 States had such agreements. By 1943, most States were included in the Federal-State program.

In a typical agreement, the Federal field office was combined with the statistical unit of the State department of agriculture. The new office was under the direction of the State statistical agent, who was appointed mutually by the Federal and State Governments but was under Federal Civil Service.

Methods

Methods used in the agricultural estimating work remained basically unchanged throughout the 1903-42 period. That is, current estimates continued to be extrapolated from earlier year levels mainly on the basis of nonrandom but scattered indications mailed by voluntary reporters.

Numerous refinements on the basic methods were introduced, however. Two of particular importance were: (1) Substitution of "individual farm" reported acreage data for "locality judgment" reported data as indications used for making acreage estimates; and (2) development of graphic regression techniques for evaluating the bias in reported indications when these are used as the basis for estimates. Other refinements included development of reporter lists to give more representative geographical distribution and weighting of reported indications by size groups on the basis of known historic data.

During the latter part of this period the reporting service also inaugurated research projects on methods of utilizing sample designs based on the mathematical theory of representative sampling, which was based on the calculus of probability.

Individual farm data.—The gradual substitution of "individual farm" acreage reports for locality judgment reports started about 1920. By 1926, the individual farm indication of acreage change had come into full use for all crops.

Before 1920, locality judgment data were the chief indications used for making acreage estimates. For example, the estimated corn acreage in July was based on reports from farm correspondents who gave their judgment of the acreage in corn in their localities in the current year, expressed as percentages of the preceding year. Each reporter was expected to make allowances for varying acreage per farm as well as for varying acreage changes from the preceding year among farms. Precision in the estimates, which depended on an accurate appraisal of the change in acreage was hardly possible because most reporters were unable to gage changes more closely than 5 to 10 percent, and most reporters would not report in excess of 100 percent.

The Crop Reporting Service had made a start in obtaining the current series of individual farm data as early as 1908, when cotton farmers were asked to report cotton acreage planted on their farms. Then, starting in 1912, all of the regular reporters were asked to report acreage of various crops grown on their farms in the current and in the preceding year. The results of these inquiries were available for the annual review of crop acreages made each December, but for acreage estimates in this early period the statisticians relied mainly on the locality judgment inquiry. Technical improvement had to be made in questionnaire construction of the individual farm inquiries, and problems in tabulation, weighting, and representativeness of the sample had to be solved.

By 1927 it was standard procedure to consider several indications computed from individual farm acreage reports. For one, called the C/H (current to historic), reporters were asked to report both this year's and last year's acreage in each crop. A percent change for each crop was then computed from the total reported acreages for the two years.

In 1928 a new indication, called the C/C (current to current) was originated. For this, returns from the same farms were tabulated for each of two successive years. A percent change was computed from the totals of the 2 years.

A third computed indication sometimes used was the R/R (ratio relative). This is a method of deriving change in acreage for a given crop from one year to another by comparing the ratio that each crop bears to all crops or to all land in farms or to the total of all crops for one year with a similar ratio for the second year.

The development of regression techniques about 1928 made possible the use of the "ratio to land" indication for each year separately. The current aggregate acreage

of each crop was expressed as a percentage of the total farmland of the farms reporting and was plotted for each year against the Board's estimated acreage for each year and against the census acreage in census years. This had the advantage of placing the estimate for each year in independent relation to census years and avoided problems of cumulative error when using the above three percentage indications.

In 1929 the reporting service initiated annual yearend yield inquiries, in which the farmer is asked to report acreages harvested and total production in bushels, pounds, tons, and so on. This type of inquiry had been used in scattered States as early as 1926.

Throughout the 1903-42 period, however, preharvest "condition" reporting continued to be a locality judgment.

Graphic regression techniques.—The development of graphic regression techniques (described in chapter 2) as a means of appraising reported indications paralleled the development of the new series of individual farm indications on acreage and yield. Beginning in 1928, these techniques were used to evaluate the bias in the individual farm indications of acreage and yield when these were used as a basis for estimates. Beginning in 1929, these techniques were also used for yield forecast estimating based on preharvest "condition" reports.

USDA Crop Reporting—1943 to Present

Developments in the Statistical Reporting Service program since 1943 and its present scope and methods are described in detail in the main part of this publication.

APPENDIX C. LAWS GOVERNING CROP REPORTS

(All references are to United States Code)

General

Title 5, Section 511

Establishment of Department.—There shall be at the seat of government a Department of Agriculture, the general design and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture, in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants. (R.S. § 520) (5 U.S.C. 511).

Title 5, Section 514

General duties of Secretary.—The Secretary of Agriculture shall procure and preserve all information concerning agriculture which he can obtain by means of books and correspondence, and by practical and scientific experiments, accurate records of which experiments shall be kept in his office, by the collection of statistics, and by any other appropriate means within his power; he shall collect new and valuable seeds and plants; shall test, by cultivation, the value of such of them as may require such tests; shall propagate such as may be worthy of propagation; and shall distribute them among agriculturists. (R.S. § 526) (5 U.S.C. 514).

Title 7, Section 411a

Monthly crop report; contents; issuance; approval by Secretary of Agriculture.—The monthly crop report, which shall be gathered as far as practicable from practical farmers, shall be printed and distributed on or before the twelfth day of each month, and shall embrace statements of the conditions of crops by States, in the United States, with such explanations, comparisons, and information as may be useful for illustrating the above matter, and it shall be submitted to and officially approved by the Secretary of Agriculture, before being issued or published. Mar. 4, 1909, c. 301, 35 Stat. 1053; Mar. 4, 1917, c. 179, 39 Stat. 1157 (7 U.S.C. 411a).

Title 18, Section 1902

Disclosure of crop information and speculation thereon.—Whoever, being an officer, employee or person acting for or on behalf of the United States or any department or agency thereof, and having by virtue of his office, employment or position, become possessed of information which might influence or affect the market value of

any product of the soil grown within the United States, which information is by law or by the rules of such department or agency required to be withheld from publication until a fixed time, willfully imparts, directly or indirectly, such information, or any part thereof, to any person not entitled under the law or the rules of the department or agency to receive the same; or, before such information is made public through regular official channels, directly or indirectly speculates in any such product by buying or selling the same in any quantity, shall be fined not more than \$10,000 or imprisoned not more than ten years, or both.

No person shall be deemed guilty of a violation of any such rules, unless prior to such alleged violation he shall have had actual knowledge thereof. June 25, 1948, c. 645, § 1, 62 Stat. 790. (18 U.S.C. 1902).

Title 18, Section 2072

False crop reports.—Whoever, being an officer or employee of the United States or any of its agencies, whose duties require the compilation or report of statistics or information relating to the products of the soil, knowingly compiles for issuance, or issues, any false statistics or information as a report of the United States or any of its agencies, shall be fined not more than \$5,000 or imprisoned not more than five years, or both. June 25, 1948, c. 645, § 1, 62 Stat. 795. (18 U.S.C. 2072).

Cotton

Title 7, Section 471

Statistics and estimates of grades and staple length of cotton; collection and publication.—The Secretary of Agriculture is authorized and directed to collect and publish annually, on dates to be announced by him, statistics or estimates concerning the grades and staple length of stocks of cotton, known as the carry-over, on hand on the 1st of August of each year in warehouses and other establishments of every character in the continental United States; and following such publication each year, to publish, at intervals in his discretion, his estimate of the grades and staple length of cotton of the then current crop: Provided, That not less than three such estimates shall be published with respect to each crop. In any such statistics or estimates published, the cotton which on the date for which such statistics are published may be recognized as tenderable on contracts of sale of cotton for future delivery under the United States Cotton Futures Act, shall be stated sepa-

rately from that which may be untenderable under said act. (Mar. 3, 1927, c. 337, § 1, 44 Stat. 1372.)

Title 7, Section 476

Acreage reports.—The Secretary of Agriculture shall cause to be issued a report on or before the 10th day of July of each year showing by States and in toto the estimated acreage of cotton planted, to be followed on August 1 with an estimate of the acreage for harvest and December 1 with an estimate of the harvested acreage. May 27, 1912, c. 135, Sec. 1, 37 Stat. 118; Mar. 3, 1927, c. 337, Sec. 6, 44 Stat. 1374; May 29, 1958, Sec. 1, 72 Stat. 149. (7 U.S.C. 476).

Title 7, Section 475

Cotton crop reports.—The Secretary of Agriculture shall cause to be issued as of the first of each month during the cotton growing and harvesting season from August to December inclusive, reports describing the condition and progress of the crop and stating the probable number of bales which will be ginned, these reports to be issued simultaneously with the cotton-ginning reports of the Bureau of the Census relating to the same dates, the two reports to be issued from the same place at 11 o'clock antemeridian of the eighth day following that to which the respective reports relate. When such date of release falls on Sunday, a legal holiday, or other day, which pursuant to statute or Executive order is a nonworkday in the Department of Agriculture at Washington generally, the report shall be issued at 11 o'clock antemeridian of the next succeeding workday. No such report shall be approved and released by the Secretary of Agriculture until it shall have been passed upon by a cotton-crop reporting committee or board consisting of five members or more to be designated by him, not less than three of which shall be supervisory field statisticians of the Department of Agriculture located in different sections of the cotton-growing States, experienced in estimating cotton production and who shall have first hand knowledge of the condition of the cotton crop based upon recent field observations, and the majority of which committee or board shall be familiar with the methods and practices of producing cotton. May 3, 1924, c. 149, Sec. 1, 43 Stat. 115; Mar. 3, 1927, c. 337, Sec. 5, 44 Stat. 1373; Aug. 8, 1946, c. 909, 60 Stat. 940; May 29, 1958, Sec. 2, 72 Stat. 149. (7 U.S.C. 475).

Title 12, Section 1141j(d)

Governmental publication; predictions as to cotton prices prohibited.—The inclusion in any governmental report, bulletin, or other such publication hereafter issued or published of any prediction with respect to cotton prices is prohibited. Any officer or employee of the United States who authorizes or is responsible for the inclusion in any such report, bulletin, or other publication of any such prediction, or who knowingly causes the issuance or publication of any such report, bulletin, or other publication containing any such prediction, shall, upon conviction thereof, be fined not less than \$500

or more than \$5,000, or imprisoned for not more than five years, or both: Provided, That this subdivision shall not apply to the Governor of the Farm Credit Administration when engaged in the performance of his duties herein provided. June 15, 1929, c. 24, Sec. 15, 46 Stat. 18 (12 U.S.C. 1141j(d)).

Annual appropriation acts contain a similar prohibition in this form, "No part of the funds appropriated by this Act shall be used for the payment of any officer or employee of the Department who, as such officer or employee, or on behalf of the Department of any division, commission, or bureau thereof, issues, or causes to be issued, any prediction, oral or written, or forecast, except as to damage threatened or caused by insects and pests, with respect to future prices of cotton or the trend of same." Pub. L. 87-879, Oct. 24, 1962.

Title 13, Section 42

Contents of reports; number of bales of linter; distribution; publication by Department of Agriculture.—

(a) The statistics of the quantity of cotton ginned shall show the quantity ginned from each crop prior to August 1, August 16, September 1, September 16, October 1, October 18, November 1, November 14, December 1, December 13, January 16, and March 1; but the Secretary may limit the canvasses of August 1 and August 16 to those sections of the cotton-growing States in which cotton has been ginned.

(b) The quantity of cotton consumed in manufacturing establishments, the quantity of baled cotton on hand, the number of active consuming cotton spindles, the number of active spindle-hours, and the statistics of cotton imported and exported shall relate to each month, and shall be published as soon as possible after the close of the month.

(c) In collecting and publishing statistics of cotton on hand in warehouses and other storage establishments, and of cotton known as the "carry-over" in the United States, the Secretary shall ascertain and publish as a separate item in the report of cotton statistics the number of bales of linters as distinguished from the number of bales of cotton.

(d) The Secretary shall furnish to the Department of Agriculture, immediately prior to the publication of each report of that Department regarding the cotton crop, the latest available statistics hereinbefore mentioned, and the Department of Agriculture shall publish the same in connection with each of its reports concerning cotton. Aug. 31, 1954, c. 1158, 1, 68 Stat. 1016. (13 U.S.C. 42).

Title 13, Section 43

Records and reports of cotton ginner.—Every cotton ginner shall keep a record of the county or parish in which each bale of cotton ginned by him is grown and report at the March canvass of each year a segregation of the total number of bales ginned by counties or parishes in which grown. Aug. 31, 1954, c. 1158, 1, 68 Stat. 1016. (13 U.S.C. 43).

Title 13, Section 44

Foreign cotton statistics.—In addition to the information regarding cotton in the United States provided for in this subchapter, the Secretary shall compile, by correspondence or the use of published reports and documents, any available information concerning the production, consumption, and stocks of cotton in foreign countries, and the number of cotton-consuming spindles in such countries. Each report published by the Department of Commerce or agency or bureau thereof regarding cotton shall contain an abstract of the latest available information obtained under the provisions of this section, and the Secretary shall furnish the same to the Department of Agriculture for publication in connection with the reports of that department concerning cotton in the same manner as in the case of statistics relating to the United States. Aug. 31, 1954, c. 1158, 1, 68. Stat. 1016. (13 U.S.C. 44).

Title 13, Section 45

Simultaneous publication of cotton reports.—The reports of cotton ginned to the dates as of which the Department of Agriculture is also required to issue cotton crop reports shall be issued simultaneously with the cotton crop reports of that department, the two reports to be issued from the same place at 11 o'clock antemeridian on the eighth day following that on which the respective reports relate. When such date of release falls on Sunday, a legal holiday, or other day which pursuant to statute or Executive order is a nonworkday in the Department of Commerce at Washington generally, the reports shall be issued at 11 o'clock antemeridian of the next succeeding workday. August 31, 1954, c. 1158, 1, 68. Stat. 1017. (13 U.S.C. 45).

Apples**Title 7, Section 411b**

Estimates of apple production.—Estimates of apple production shall be confined to the commercial crop. June 30, 1939, c. 253, Title I, 53 Stat. 968; and all subsequent annual appropriation acts.

Naval Stores**Title 5, Section 556b**

Statistics relating to turpentine and rosin.—The Secretary of Agriculture is authorized and directed to collect and/or compile and publish annually, and at such other times, and in such form and on such date or dates as he shall prescribe, statistics and essential information relating to spirits of turpentine and rosin produced, held, and used in the domestic and foreign commerce of the United States. (Aug. 15, 1935, c. 548, 49 Stat. 653.) (5 U.S.C. 556b).

Peanuts**Title 7, Section 951**

Collection and publication; facts required; submission of report.—The Secretary of Agriculture is authorized

and directed to collect and publish statistics of raw peanuts, shelled, unshelled, and crushed, and peanut oil, in the United States, received, processed, shipped, and owned by or in the possession of warehousemen, brokers, cleaners, shellers, dealers, growers' cooperative associations, crushers, salters, manufacturers of peanut products, and owners other than the original producers of peanuts: Provided, That the Secretary may, in his discretion, omit for any period of time to collect such statistics from any or all salters of peanuts or manufacturers of peanut products who used, during the calendar year preceding that for which statistics are being collected, less than thirty thousand pounds of shelled and unshelled peanuts. Such statistics shall show the quality of peanuts in such details as to kinds—Virginias, Runners, Spanish, and imported varieties—as the Secretary shall deem necessary for the purposes of this chapter. All reports except those required from persons owning or operating peanut picking or threshing machines shall be submitted monthly in each year, except as otherwise prescribed by the Secretary. June 24, 1936, c. 745, Sec. 1, 49 Stat. 1898; May 12, 1938, c. 199, Sec. 1, 52 Stat. 348; July 17, 1957, Sec. 1, 71 Stat. 306. (7 U.S.C. 951).

Tobacco**Title 7, Section 501**

Collection and publication; facts required; deteriorated tobacco.—The Secretary of Agriculture is authorized and directed to collect and publish statistics of the quantity of leaf tobacco in all forms in the United States and Puerto Rico, owned by or in the possession of dealers, manufacturers, quasi-manufacturers, growers' cooperative associations, warehousemen, brokers, holders, or owners, other than the original growers of tobacco. The statistics shall show the quantity of tobacco in such detail as to types, groups of grades, and such other subdivisions as to quality, color, and/or grade for particular types, as the Secretary of Agriculture shall deem to be practical and necessary for the purposes of this section and sections 502 to 508 of this title, shall be summarized as of January 1, April 1, July 1, and October 1 of each year, and an annual report on tobacco statistics shall be issued: Provided, That the Secretary of Agriculture shall not be required to collect statistics of leaf tobacco from any manufacturer of tobacco who, in the first three quarters of the preceding calendar year, according to the returns of the Commissioner of Internal Revenue or the record of the Treasurer of Puerto Rico, manufactured less than thirty-five thousand pounds of tobacco, or from any manufacturer of cigars who, during the first three quarters of the preceding calendar year, manufactured less than one hundred and eighty-five thousand cigars, or from any manufacturer of cigarettes who, during the first three quarters of the preceding year, manufactured less than seven hundred and fifty thousand cigarettes: And provided further, That the Secretary of Agriculture may omit the collection of

statistics from any dealer, manufacturer, growers' co-operative association, warehouseman, broker, holder, or owner who does not own and/or have in stock, in the aggregate, fifty thousand pounds or more of leaf tobacco on the date as of which the reports are made. For the purposes of this section and sections 502 to 508 of this title, any tobacco which has deteriorated on account of

age or other causes to the extent that it is not merchantable or is unsuitable for use in manufacturing tobacco products shall be classified with other nondescript tobacco and reported in the "N" group of the type to which it belongs. Jan. 14, 1929, c. 69, § 1, 45 Stat. 1079; July 14, 1932, c. 480, § 1, 47 Stat. 662; Aug. 27, 1935, c. 749, § 1, 49 Stat. 893. (7 U.S.C. 501).

APPENDIX D. CROP REPORTING REGULATIONS

The official regulations of the Department of Agriculture concerning the preparation of the agricultural data estimates of the Service follow:

Title 1 — General Authorities and Functions

CHAPTER 6—OTHER AUTHORITIES AND FUNCTIONS

Section 1—Crop Reporting Board

325. **AUTHORITIES AND FUNCTIONS.** (S)—There shall be in the Statistical Reporting Service a Crop Reporting Board, the primary function of which shall be to prepare and issue, as provided in paragraph 328 and elsewhere in this regulation, the official State and National estimates and reports of the Department relating to crop production, livestock and livestock products, numbers of livestock on farms, stocks of agricultural commodities, local market prices, value of farm products, and such other subjects as the Administrator of the Statistical Reporting Service may direct. Among these reports shall be a Monthly Crop Report, which shall be issued on or before the 12th of each month pursuant to 7 U.S.C. 411a, a Cotton Acreage Report to be issued on or before the 10th of July, and the Cotton Crop Report to be issued on the 8th day of each month from August to December, or, if the 8th day is a nonwork day, on the next succeeding workday, pursuant to 7 U.S.C. 475 and 476.

326. **DEFINITIONS.**—As used in these regulations, "Department" means the United States Department of Agriculture, "Service" means the Statistical Reporting Service staff engaged in statistical reporting work, and "Board" means the Crop Reporting Board.

327. **ORGANIZATION OF BOARD.** a. *Chairman.*—The Deputy Administrator of the Statistical Reporting Service is the Chairman of the Board. He shall call and preside over all meetings of the Board. As Deputy Administrator of the Statistical Reporting Service, he shall issue the necessary instructions for gathering, compiling, and summarizing data for reports specified in paragraph 328, and shall approve the statistical techniques and procedures to be followed by the Service and by the Board in analyzing, interpreting, and reviewing the pertinent data and in preparing the official estimates for each report.

b. *Members.*—The Chairman shall select the members of the Board for each report from the Service. For the Monthly Crop Report the Board shall have not less than five members in addition to the Chairman, not less than two of whom shall be selected from the Service field offices. For the Cotton Report the Board shall have not

less than five members, of whom not less than three members shall be supervisory field statisticians located in different sections of the cotton growing States, experienced in estimating cotton production and who have first-hand knowledge of the condition of the cotton crop based on recent field observations, and a majority of the Board shall be familiar with the methods and practices of producing cotton, as provided in the Act of May 3, 1924, as amended (7 U.S.C. 475). For the Annual Cotton Crop Summary in May, the Annual Crop Production Summary in December, the Winter Wheat and Rye Report as of December 1, the Prospective Plantings Report as of March 1, the Annual Livestock Summary as of January 1, and the Pig Crop Reports as of June 1 and December 1, the Board shall consist of not less than five members, of whom not less than two shall be selected from the Service field offices.

c. *Secretary of the Board.*—The Board shall have a permanent Secretary, who shall be a professional member of the Service in Washington. He shall assist in preparing instructions and forms for collecting, compiling, summarizing, and analyzing statistical information for the use of the Board, shall arrange for suitable means for transmission of instructions, records, and reports to and from the field offices, shall maintain records of the information assembled, including a record of the official estimates prepared by the Board, and shall maintain a file of the signed copies of Board reports. For each report the Secretary shall assemble and collate information for the use of the Board, issue proper notices of Board meetings, and make necessary arrangements for the preparation, signing, and release of reports in such manner and at such times as are herein described.

328. **REPORTS.** a. *Reports to be approved by the Secretary of Agriculture.*—The following Board reports shall be signed by the Chairman, Secretary, and members of the Board, and shall be approved by the Secretary of Agriculture before being issued or published:

Monthly Crop Reports, except for February, March, and December (see paragraph 325).

Cotton Reports (see paragraph 325).

Annual Cotton Crop Summary in May.

Annual Crop Production Summary in December.

Winter Wheat and Rye Report as of December 1.

Prospective Plantings Report as of March 1.

Annual Livestock Summary as of January 1.

Pig Crop Reports as of June 1 and December 1.

b. *Other Board reports.*—Such other reports as are designated by the Chairman shall be prepared and issued as Board reports. For each such report, the Chairman shall select Board members from the Service in such manner and in such numbers as may be deemed necessary. Such reports shall be approved by the Chairman or his designee before being issued.

c. *Annual release schedule.*—On or before the first day of December of each year there shall be prepared a schedule for the ensuing year setting forth dates and hours of release of all regular statistical reports listed in subparagraph "a" above for which the approval of the Secretary of Agriculture is required. The schedule of reports shall be effective when approved by the Secretary of Agriculture and may be amended at any time with his approval. Subsequently, there shall also be prepared and issued, to the extent possible, an advance listing of the reports referred to in subparagraph "b" above, together with dates of publication or issuance.

329. *COLLECTION OF INFORMATION.*—For use in preparing the official estimates of the Department, information relating to agriculture shall be gathered through the Washington and field offices of the Service, as far as practicable, from practical farmers, as provided in 7 U.S.C. 411a; from peanut processors, as provided in 7 U.S.C. 951 et seq.; from processors, dealers, cooperating State and local officials, agencies in the Department; and from other sources. This information shall be collected by mailed questionnaire, by sample enumeration, by interviews, or by other appropriate means (7 U.S.C. 411a, 951).

330. *INFORMATION NOT TO BE RELEASED; SPECULATION; FALSE STATISTICS.* a. *Withholding information.*—The contents and every part of the contents of each and every report specified in paragraph 328a, and the information and every part of the information utilized in the preparation of such reports, shall be withheld from publication until the day and hour provided for the issuance of the reports in the schedule approved by the Secretary of Agriculture and amendments thereto.

b. *Access to information.*—No member of the Board or other persons engaged in the preparation of information for reports, shall, before the release of any Board report provided for herein, willfully impart or permit access to any information contained therein or any part thereof, directly or indirectly, to any person not entitled under the law and rules of the Department to receive the same. The Chairman may under this regulation notify officers in charge of field offices, in advance of publication, of changes made by the Board from recommendations submitted by such officers for non-speculative items as defined in paragraph 331a(2).

c. *Statutory provisions.*

(1) "Whoever, being an officer, employee or person acting for or on behalf of the United States or any department or agency thereof, and having by virtue of his office, employment or position, become possessed of information which might influence or affect the market value of any product of the soil grown within the United States, which information is by law or by the rules of

such department or agency required to be withheld from publication until a fixed time, willfully imparts, directly or indirectly, such information, or any part thereof, to any person not entitled under the law or the rules of the department or agency to receive the same; or, before such information is made public through regular official channels, directly or indirectly speculates in any such product by buying or selling the same in any quantity, shall be fined not more than \$10,000 or imprisoned not more than ten years, or both.

"No person shall be deemed guilty of a violation of any such rules, unless prior to such alleged violation he shall have had actual knowledge thereof." (June 25, 1948, ch. 645, sec. 1, 62 Stat. 790, 18 U.S.C. 1902.)

(2) "Whoever, being an officer or employee of the United States or any of its agencies, whose duties require the compilation or report of statistics or information relating to the products of the soil, knowingly compiles for issuance, or issues, any false statistics or information as a report of the United States or any of its agencies, shall be fined not more than \$5,000 or imprisoned not more than 5 years, or both." (June 25, 1948, ch. 645, sec. 1, 62 Stat. 795, 18 U.S.C. 2072.)

331. *SPECULATIVE AND NONSPECULATIVE DATA.* a. *Definition.*—Data used by the Board in the preparation of the Monthly Crop Report and the Cotton Report shall be classified as follows:

(1) *Speculative data.*—Speculative data are defined to be data relating to corn, wheat, oats, cotton, or soybeans, the assembling and collating of which would make it possible for any member, members, or assistants of the Board approximately to anticipate the Board's forthcoming report for the United States on the condition, yield, probable production, or farm stocks of designated commodities, or the acreage or ginnings of cotton. These data shall be deemed to be speculative for:

(a) *Corn* in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin.

(b) *Winter wheat* in Illinois, Indiana, Kansas, Missouri, Montana, Nebraska, Ohio, Oklahoma, Texas, and Washington.

(c) *Spring wheat* in Idaho, Minnesota, Montana, North Dakota, South Dakota, and Washington.

(d) *Oats* in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

(e) *Cotton* in Arkansas, Louisiana, Mississippi, Oklahoma, and Texas.

(f) *Soybeans* in Illinois, Indiana, Iowa, Missouri, Minnesota, and Ohio.

(2) *Nonspeculative data.*—Nonspeculative data are defined to be any statistical data other than the speculative data defined in paragraph (1) above.

b. *Transmission.*

(1) *Field procedure.*—Summaries of speculative data collected in the field offices, together with recommendations of the officer in charge of each such office, shall be transmitted by mail or telegraph to the Secretary of Agriculture. When transmitted by mail, the sum-

maries and recommendations shall be forwarded in a sealed envelope marked "Special A." When transmitted by telegraph, the summary and recommendations shall be forwarded in a secret code provided by the Secretary of the Board. Nonspeculative data may at all times be forwarded directly to the Secretary of the Board by the officers in charge of the field offices.

(2) *Departmental procedure.*—Immediately upon its receipt in the Department Telegraph Office, each telegram containing speculative crop report data shall be placed in a sealed envelope marked "Special A" in the Department Telegraph Office and delivered by special messenger to the Office of the Secretary of Agriculture.

c. *Custody of "Special A" envelopes.*—All "Special A" envelopes containing speculative crop report data received in the Office of the Secretary of Agriculture shall, immediately upon receipt and without breaking the seals thereof, be placed in the locked box provided for that purpose in the Office of the Secretary of Agriculture.

d. *Opening of "Special A" envelopes.*—Immediately preceding the convening of the Board on the day a report is to be published, the locked box in the Office of the Secretary of Agriculture containing the "Special A" envelopes shall be opened and the envelopes removed in the presence of a designated representative of the Secretary of Agriculture, the Chairman, Secretary, and one other member of the Board, and a special guard provided by the General Services Administration. The Chairman, Secretary, and other member of the Board, accompanied by the guard, shall then proceed directly to the Board rooms.

332. BOARD ROOMS. a. *Definition.*—The Board rooms shall consist of the Board room proper and all other rooms occupied during the locked-in session of the Board by clerks, stenographers, and others engaged in assisting the Board in the preparation of the report.

b. *Safeguards against communication of information.*—Previous to the arrival of the Board representatives and guard with the sealed "Special A" envelopes, the Secretary of the Board shall have caused all windows in the Board rooms to be sealed in such manner as to prevent communication between persons within the Board rooms and persons outside. Also, previous to the arrival, all telephones in the Board rooms and connected with the central Department telephone switchboard shall be disconnected at the central switchboard, and any other means of communication from the Board rooms shall be similarly disconnected. Immediately after the entrance of the Board representatives into the Board rooms, with the sealed "Special A" envelopes, the guard shall lock all doors leading from the Board rooms, and remain on watch until the report is released. While on watch, the guard shall not permit any communication between persons within the Board rooms and persons outside except as provided below. The guard shall unlock the door only to permit:

- (1) The entrance of:
 - (a) The Secretary of Agriculture.
 - (b) The Administrator of the Service.
 - (c) Officials of the Bureau of the Census who co-

operate in issuing the Joint Cotton Ginning and Production Report.

(d) Employees of the Service and other persons whose presence is required in the preparation of the report and who have written permission from the Chairman.

(e) Other officials and employees of the Department having written authority from the Secretary of Agriculture, or from the Administrator of the Statistical Reporting Service.

(2) The delivery to the Board rooms of mail, telegrams, written communications, or supplies for use of the Board.

(3) Notification by the Chairman to the guard of delay in completion of a Board report (see subparagraph 333d) or by the Chairman or the Secretary of the Board to convey emergency instructions essential to completion of a report.

(4) The departure of:

(a) The Secretary of Agriculture, the Chairman, and such other persons as may be designated at the time by the Chairman, for the purpose of proceeding, under guard, to the room provided for the release of the report.

(b) Any person in the case of extreme emergency, in which event a member of the guard shall accompany and remain with such person until the release of the report.

(c) All persons in case of fire or other serious emergency.

333. APPROVAL AND RELEASE OF REPORTS. a. *Approval.*—Upon the completion of any Board reports specified in subparagraph 328a of these regulations, a copy must be signed by the Chairman, Secretary, and each member of the Board, and approved in writing by the Secretary of Agriculture before it is released. The Chairman, accompanied by a member of the guard and not less than two other persons, shall take copies of the approved report from the Board rooms to the release room before the time specified for the publication and release of the report.

b. *Release officer.*—A designated representative of the Secretary of Agriculture shall act as release officer and shall provide in the release room suitable telegraph and telephone facilities for all persons desiring such facilities for the transmission of the report upon its official release.

c. *Procedure.*—Upon the arrival in the Board release room of the Chairman and persons accompanying him, the release officer shall cause all persons other than the Chairman to remain within a prescribed area until the release of the report, the limits of which area shall be not less than 6 feet from the telephones, telegraph instruments, and tables or shelves provided for distribution of copies of the report. The Chairman then shall place copies of the report, face down, beside each instrument, and additional copies, face down, upon the tables or shelves provided for that purpose. At the exact

time provided for the official issuance of each report, the release officer shall inform those present that the report is released to the public and permit access to the copies of the report. The release officer then shall notify the guard at the door of the Board rooms that the report has been released and the guard thereupon shall unlock the doors of the Board rooms.

d. *Delay in releasing reports.*—In the event that the report should not be completed and approved for issuance at the designated time, the Chairman, within 10 minutes of the time designated for the release of the report, shall notify the guard of the time when the report will be ready for release. The guard immediately shall notify the release officer, who, in turn, shall notify all persons who are present in the release room for

the purpose of receiving the report. In order that telephone communication with the Board rooms may not be reestablished before the crop report is completed and released, the release officer also shall notify the employee in charge of the central Department telephone switchboard of the delay.

334. **ACKNOWLEDGEMENT OF REGULATION.**—The Deputy Administrator of the Statistical Reporting Service shall cause to be delivered, or exhibited, a copy of this regulation to each employee of the Service or other person having access to crop report data in advance of publication. The Deputy Administrator or an authorized representative shall obtain from each such person a certification which shall be an acknowledgement that such person has read this regulation and will be governed by it.